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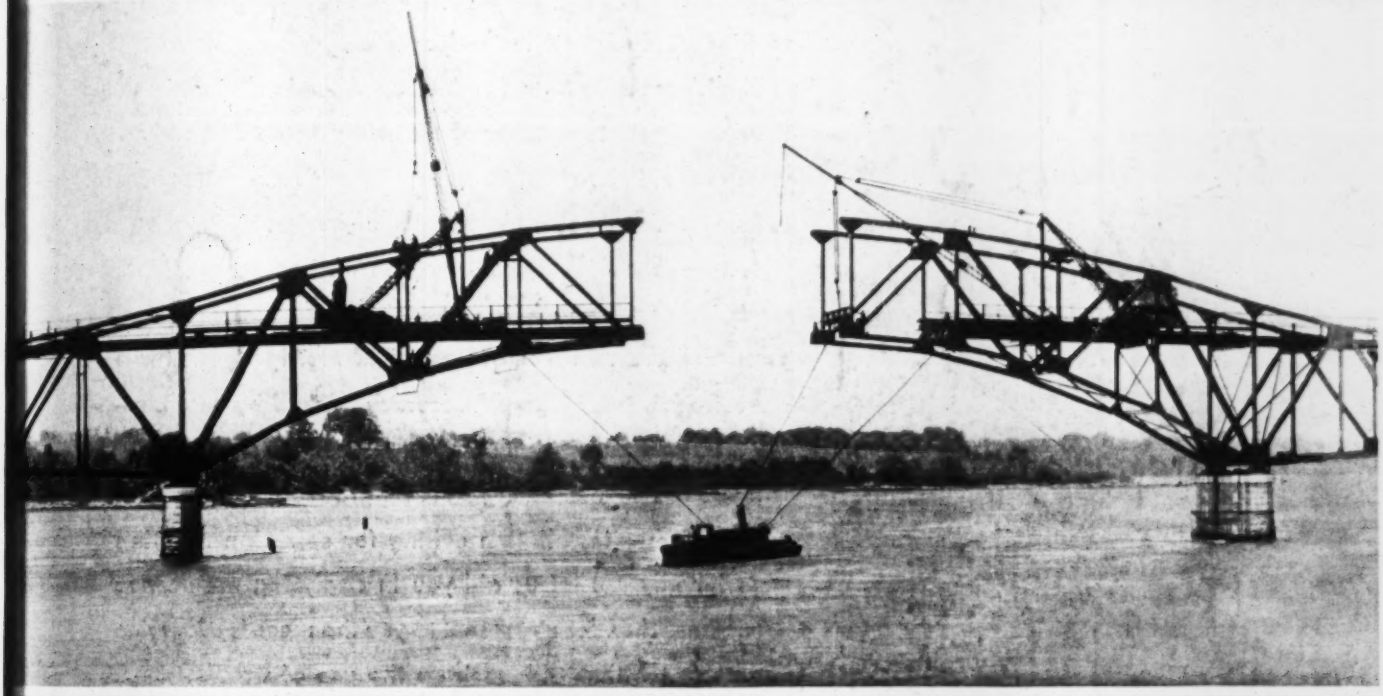
September 27, 1934

Engineering News-Record



Erecting the channel span of the new Little Bay crossing north of Portsmouth, N. H., a 1,500 ft. structure featured by three groups of continuous spans

High-Level Bridge Link in Dover-Portsmouth Road

Large Centrifugal Pumps on English Drainage Works

Paving with De-Aired Brick in Philadelphia

Sewage Plant Survey Series—Urbana, Ill.

Deformation and Strength of Nailed Timber Joints

Enlarging Conneaut Harbor on Lake Erie

The Mettur Dam—Largest in the British Empire

Three Long-Span Steel Bridges for Washington Highways

A National Water Policy In the Making

By Carey H. Brown

Formerly Secretary
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What they Get, *or* What they Give?

FATHER ADAM, Sir Isaac Newton and William Tell each had an experience with an apple with strikingly different results. The apple was a constant factor but the results depended on the individual and the circumstances of the encounter.

All of which helps us to see more clearly the vital difference between price and value. Vital, because price is the measure of what we give and value is the measure of what we get, and the spread between these is an important measure of business success.

Price is determined largely by the producer; value, however, depends chiefly on the user. Price determines the availability of a commodity or service, value is determined by the use that is made of it. One merchant rents a shop for $1,000 and nets $10,000 from his business. Another rents an identical shop next door at the same price and nets $100,000. The price to each is the same but the value to the second is ten times what it is to the first.

To illustrate in our own field: about three years ago the Singapore Water Department was grappling with a troublesome and costly corrosion problem on an underwater pipe line. Its engineer noted in this journal an account of an American city which, under similar conditions, had found a solution in large-size rubber hose. This experience he applied to his own job with, according to his latest report, satisfactory results.

This, of course, is but typical of many cases which show that the value of a subscription to an industrial journal bears small relation to its price. Price depends on the cost of rendering the service, value depends on how effectively it is used.

Similar considerations apply to the use of advertising space. Two manufacturers buy the same space at the same price. But by his use of it, one of them makes that space worth to him many times its value to the other. Price buys the opportunity, it is the use of that opportunity that creates value for the purchaser. Price buys the advertiser a contact with an audience, what he says to that audience determines its value to him.

This distinction has a bearing on all selling effort.

Are we selling value or just price? Are we translating our commodity or service in terms of value to the prospect or are we dwelling overmuch on its cost to him? Are we forgetting that frequently the seller can show the buyer how to realize the maximum use of what he buys rather than leave him to discover that for himself? Are we talking too much of expenditure and letting value go shift for itself?

During recent years we have talked so much and heard so much about price that many have all but lost sight of value. Today the wise are again conscious of the difference and are thinking in terms of value. The engineer in Singapore thinks of the value of the story that helped him to solve his problem rather than the subscription price of the paper; the shrewd manufacturer thinks more of the value that he can derive from an effective presentation to his market than of the advertising rate; the intelligent buyer in every sphere is concerned more with value than with price because he knows that his own skill and resourcefulness will in the long run determine that value.

Under these conditions, aggressive producers are bending every effort to create more intelligent buyers, who will discriminate on the basis of what they get as well as what they give and who will know how to derive the greatest value from what they buy. Obviously the intelligent use of informative advertising by both producer and user plays an important part in the process.

Willard Chevalier

ENGINEERING NEWS-RECORD

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With a "Caterpillar" Diesel Fifty Tractor and a "Caterpillar" Road Grader, Bibb County, Georgia, is today building better roads at less cost than ever before.

Four "Caterpillar" Diesel Tractors serve the McKinley Company, one of the contractors building the Oakland, Calif., low-level tunnel road. Work goes on twenty-four hours a day.

Pushing a bulldozer, this "Caterpillar" Diesel Tractor lowers cost for the Dick Company on its contract near Audenried, Penna.

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In the News:

BOND HAS BEEN ARRANGED by the successful bidders on Grand Coulee Dam, and the $29,539,300 contract that was awarded almost two months ago has been signed. This means that construction will be rapidly accelerated by the contracting group now formally organized as The Mason-Walsh-Atkinson-Kier Co.

CONTINUING IN DISAGREEMENT over the actions of Arizona in its contest for rights to Colorado River water, Colorado has proposed a further meeting of representatives from the six other states of the basin, to be held early in October. A contract for 2,800,000 acre-ft. of Boulder Dam storage being negotiated by Arizona with the Department of the Interior prompted the call.

EXCEEDED ONLY by the 1923 earthquake among modern Japanese disasters, the typhoon of Sept. 21 took a death toll of more than 1,600, laid waste nearly 20,000 buildings and damaged a similar number. Hundreds of school buildings are included in these figures.

THE LONG-TIME ASPECT of the tree-belt project removes it from the class of drought-relief work, in the opinion of Comptroller-General McCarl, who has declined to approve the use of $15,000,000 of relief funds to start this undertaking. The benefits were considered too remote to qualify the project as "drought relief."

THE LAUNCHING of the new giant Cunard White Star liner "534" at Clydebank, Scotland, on Sept. 26 has a direct connection with the construction industry in the U. S. A. It was to accommodate this vessel and other future liners such as France's "Normandie" that the three 1,000-ft. piers were built along New York City's Hudson River waterfront.

IN A LETTER to President Roosevelt, Sept. 21, the Construction League urges the correction of three practices of "uneconomical and disruptive character"; these are the 15-per cent order and two rulings excluding private architects, engineers and contractors from certain phases of CWA and PWA building operations.

A PERMANENT FEDERAL-RELIEF FUND is urged in a statement drawn up by the executive committee of the U. S. Conference of Mayors. The fund is seen as a preparatory step to the creation of a nationwide system of Federal unemployment insurance. Continuation of a large public-works program is also strongly recommended.

In This Issue:

TO PROVIDE an improved highway outlet from Portsmouth, N. H., across the tidal estuaries to the rest of the state, a $1,675,000 project is under way. The feature of the construction program is a high-level steel bridge 1,528 ft. long, whose design and construction are reviewed in the leading article. Foundation sinking in swift tidal currents provided the major construction problem.

LACK OF DATA on the strength-deformation relation of nailed timber joints led to a series of tests reported from Stanford University. Curves for various-size nails in timber and plywood indicate the results of the tests.

SEVERAL WEEKS AGO the celebration marking the completion of the great Mettur Dam on the Cauvery River in India was the subject of worldwide news interest. Involving 2,000,000 cu. yd. of concrete and masonry and with a height of 213 ft. and a crest length of 5,000 ft., the dam provides large storage for irrigation and flood control.

A VALUABLE BACKGROUND for the current investigation of national water resources is provided in a review of the work of the Mississippi Valley Committee, presented by its former secretary. The problem is discussed in relation to the formation of a national water policy.

MODERN PRACTICE in brick-paving construction is well illustrated in a review of a Philadelphia project. A prominent feature is the use of de-aired brick, and the properties of these paving units are briefly described.

MODERNIZATION of harbor facilities along the south shore of Lake Erie is being carried out on an extensive scale by the Corps of Engineers. One of the most interesting operations is at Conneaut, Ohio, a port which rivals Cleveland in shipping tonnage, where new breakwaters are being built.

THE SERIES OF TABULATIONS of sewage-plant design and operating data is carried forward in this issue with an article devoted to the plant of the twin cities of Urbana and Champaign in Illinois.

THE ANNUAL MEETING of the New England Water Works Association, held in Boston last week, is reported herein.

Coming Articles:

FLOOD CONTROL WORK now in progress on the Mexican Border is to be reported in an article by L. M. Lawson, of the International Boundary Commission. Planning is carried forward by the main commission, but execution is under the direction of the Mexican or United States section, depending upon where the work is located.

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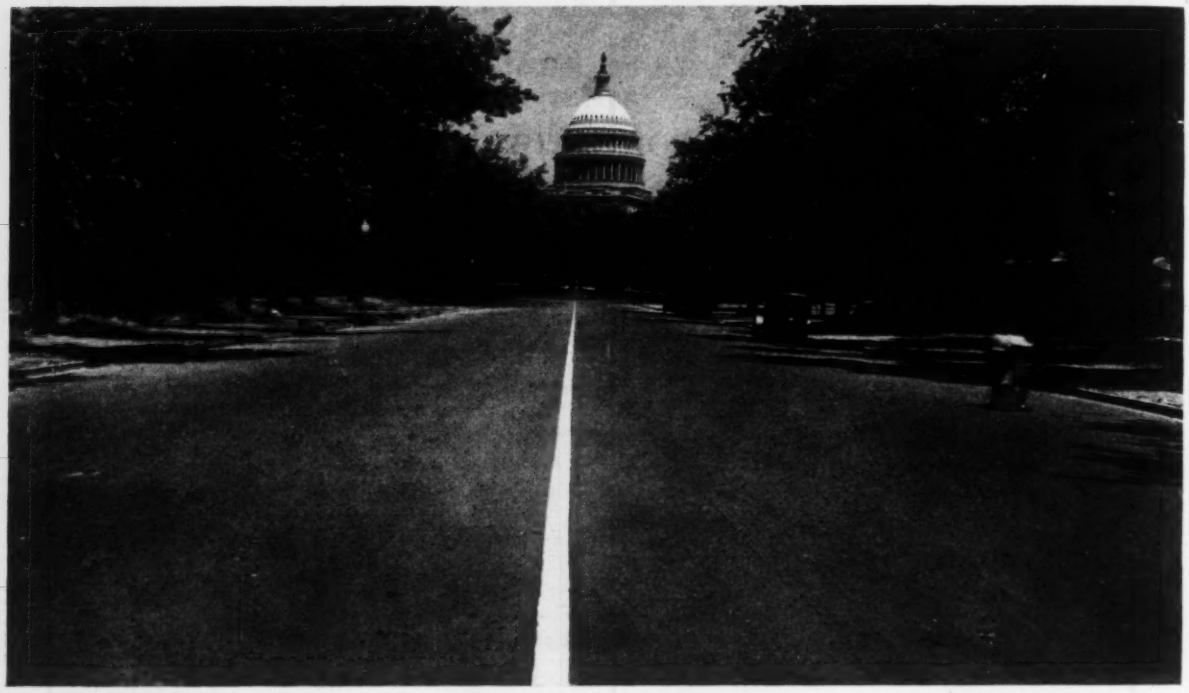
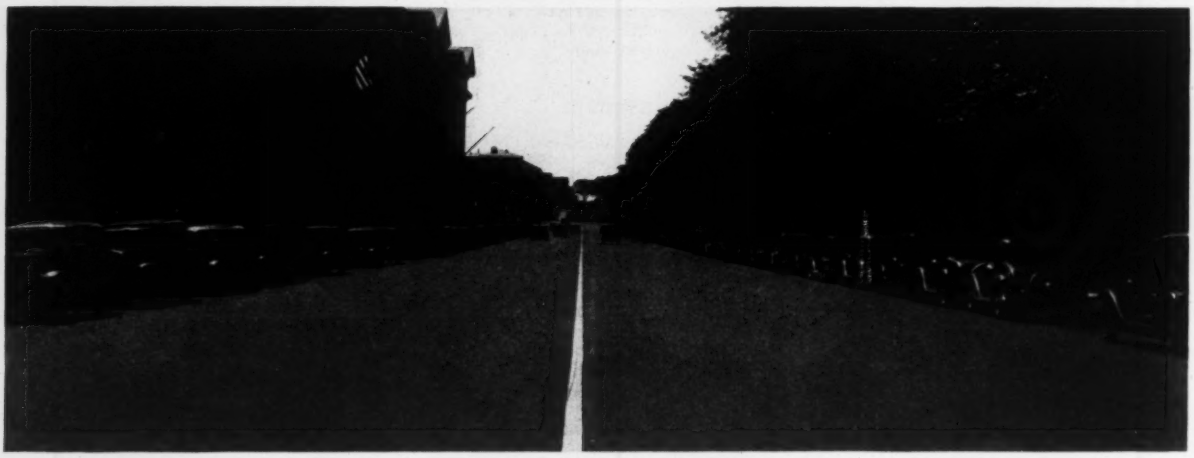


WHICH marker is two years older? These pictures of Atlas White traffic markers were taken the same week. They are reproduced exactly as taken—no "doctoring." Above is a marker installed recently, in asphalt, on Maryland Avenue, Washington. Below is a marker installed nearly *three years ago*, also in asphalt, on 15th Street, N. W., Washington. If you didn't know, could you tell which was the old, which the new? Atlas White traffic markers *do* stay white, *indelibly* white. No maintenance. No replacement cost. Write for complete information to Universal Atlas Cement Co., *Subsidiary of United States Steel Corporation*, 208 South La Salle Street, Chicago.



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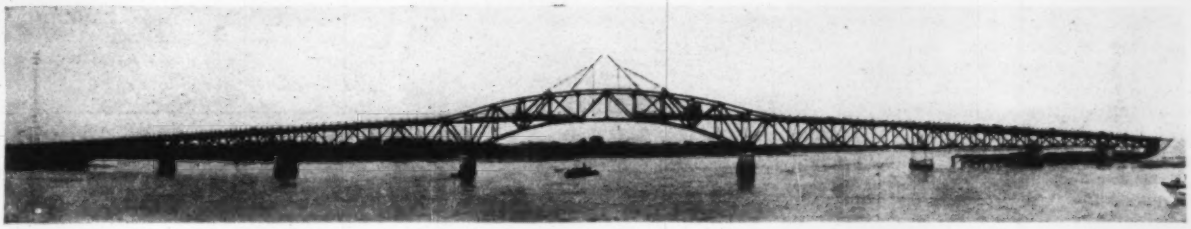
ENGINEERING NEWS-RECORD

September 27, 1934

High-Level Bridge Link in the Dover-Portsmouth Road



Trunk-highway development in southeastern New Hampshire is focused in a high-level steel bridge over the tidal estuaries that bar Portsmouth and the ocean beaches from northern New England

NEW highway connections now under construction between Portsmouth, the principal ocean port of New Hampshire, and the cities of Dover and Durham rank high among current road-engineering operations in the New England states. The principal structures of the improvement are: (1) a 20-ft. concrete road from Dover to Little Bay at Dover Point; (2) a high-level steel bridge 1,528 ft. long across Little Bay from Dover Point to the Portsmouth side; (3) a concrete trestle of unique pile construction 660 ft. long across Bellamy River on the road from Durham and the west; and (4) various short stretches of new road linking up the bridges with existing routes. The locations of the several elements of the improvement are shown by Fig. 2.

Portsmouth, as shown by the map, is rather remarkably shut off by waters from the state to the north and west. It is also on the natural travel route from these parts of the state to the beach resorts at Hampton and south to Boston, Providence and the resorts of Cape Cod and Narragansett Bay. At present the only access from north and west to Portsmouth is the old and inadequate toll bridge of the Boston & Maine Railroad. The new project provides a modern main road and bridge entrance from Dover and the north into which travel from the west through Concord and Durham has access by means of the Bellamy River bridge and its connecting roads. With a high-level bridge over Little Bay travel has also no interruption from navigation. The project is therefore a major traffic improvement and an expensive one costing about $1,675,000.

In general, the roadwork classifies as modern high-class paved main road without markedly unusual features. The main stretch is from Dover to Dover Point, about 5½ miles, mostly over old grade; connections to the bridges aggregate about 2½ miles and are over new grade. The prevailing pavement is two-lane reinforced concrete, but there are shorter stretches of bituminous macadam over new grade. Typical sections of both types are shown by Fig. 3; they show all the normal conditions of cut and fill and the corresponding sub-base construction; at special locations changes are made to curb-and-sidewalk sections as the location requires. The general roadway design and pavement structure are, however, sufficiently well indicated by Fig. 3.

The exceptional structures are the bridges, which are notable in design and particularly for the construction methods employed. The larger of these is the steel bridge over Little Bay, which is described in this article. A following article will describe the pile trestle over the Bellamy River.

Little Bay bridge

The design and structure of the high-level steel bridge over Little Bay are shown by Figs. 4 to 6. Both are closely similar to the design and structure of the road bridge across Lake Champlain designed by the same engineers and described in *Engineering News-Record*, Nov. 21, 1929, p. 796. The general elevation (Fig. 4) shows the span grouping and dimensions. The bridge spans are end-supported structures, and the

seven spans are divided into three units of continuous structure, one of which includes the center three spans. All spans are riveted trusses set on 18-ft. centers, except the middle three spans in which the spacing is 32 ft. The floor system is floor beams and stringers with a deck of reinforced concrete, giving a 24-ft. roadway and sidewalks as shown by Fig. 5. All steelwork was designed for the loadings and to the requirements of the bridge specifications of the American Association of State Highway Officials.

Concrete deck details call for notice, particularly in respect to the two-course concrete construction and the method of reinforcement both as shown by Fig. 5, and in respect to the deflection joint (Fig. 5) and expansion joints (Fig. 6). For piers 1, 6 and 7 the expansion-joint steel is anchored to and supported by the concrete slab. At pier 3, where especially large movements will occur, the joint parts are attached to the steel of the floor system. Rocker and roller bearings are of conventional types.

The bridge substructure is two reinforced-concrete abutments of cellular type and eight conventional-type granite piers (backed with concrete) to about 2 ft. below water (El. 100) and of concrete down to rock, which runs down from about El. 100 at the abutments to about El. 60 at pier 5. The design involved only usual features, but the construction presented problems.

Substructure construction

As shown by Fig. 2, the bridge is across a tidewater channel that connects Great Bay, Little Bay and their arms with the Piscataqua River, which connects with Portsmouth at the ocean. The waters of the bays form a large reservoir that is filled and emptied by every tide cycle. As all inflow and outflow of the bay waters are through the channel, fast currents up to 7 to 8 miles an hour are created. The construction problem was to build the piers in these currents, which of course were alternately in opposite directions.

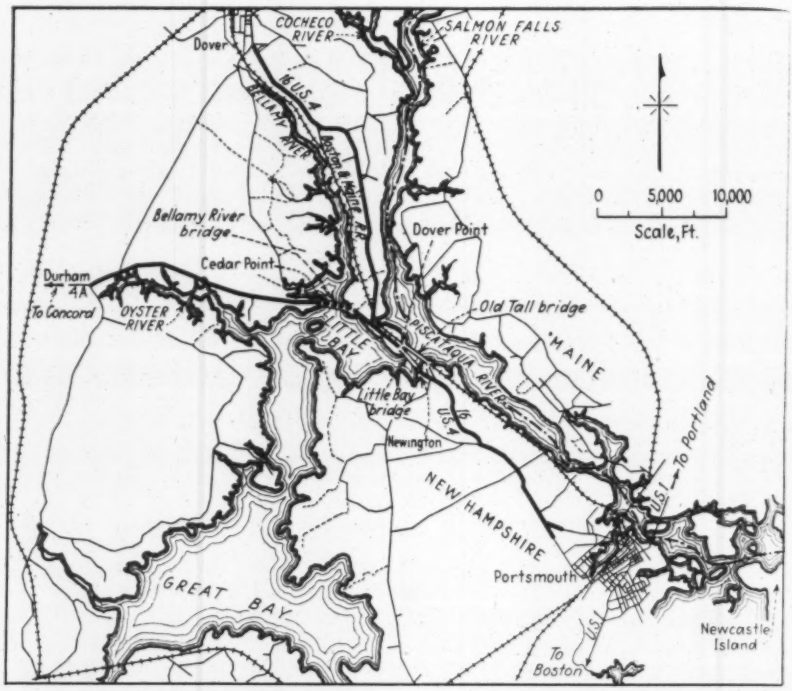


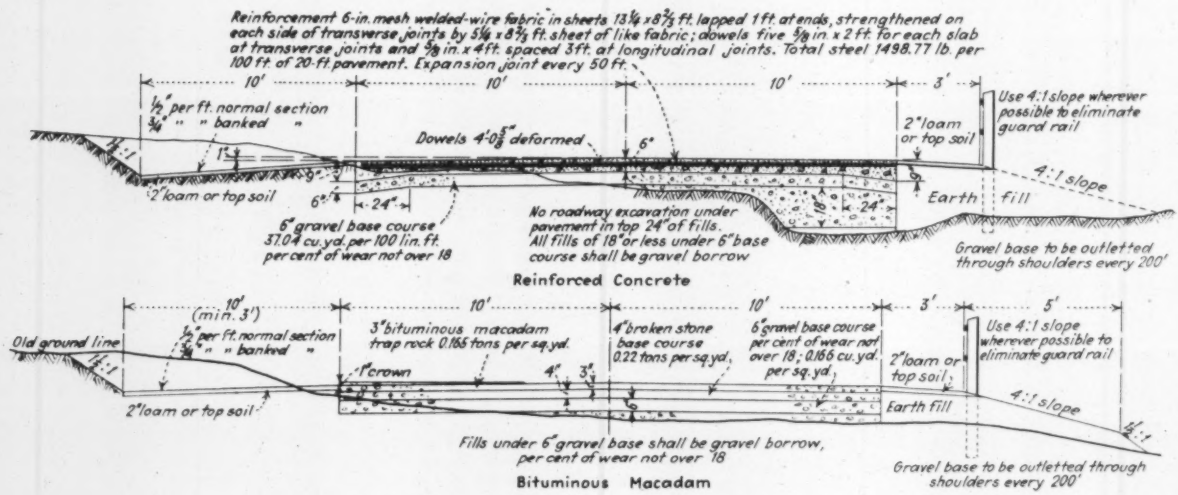
FIG. 2—LOCATION MAP of bridges and roads for improving traffic facilities out of Portsmouth to western and northern New Hampshire.

The rock bottom of the channel, which, as stated, was from a few feet to about 40 ft. below mean sea level, was covered with 4 to 10 ft. of clay, sand and gravel varying from a fairly compact mixture at the top to hardpan near the ledge surface. The specifications required the construction of the pier masonry in the dry in cofferdams, but later a change was made in the specifications, which permitted the placing of a part of the base concrete under water. The four deepest piers (Nos. 3 to 6) had bases 55x14 ft., and the others had bases 38x12 ft., which set the minimum sizes of cofferdams.

FIG. 3—PAVEMENT SECTIONS, showing base and subgrade construction on Dover-Portsmouth road.

Construction was begun by building out from the shores trestles to reach piers 1, 2 and 3 from the north and piers 8 and 7 from the south end. Working from these trestles with traveling cranes, the construction of five of the cofferdams was fairly simple. The three deep-water coffers in the main thread of the tidal current were more difficult to construct.

The first step in building a deep-water coffer was to anchor a derrick boat (Fig. 7) adjacent to the pier site by means of cables running to heavy concrete blocks sunk at outlying points in all directions. Sheetpiles were then spotted around the perimeter of the cofferdam to hold guide wales; wales and piles were then tied to the boat by block and tackle, and the sheetpile wall


Reinforcement 6-in. mesh welded-wire fabric in sheets 13¼ x 8⅔ ft. lapped 1 ft. at ends, strengthened on each side of transverse joints by 5¼ x 8⅔ ft. sheet of like fabric; dowels five ⅝ in. x 2 ft. for each slab at transverse joints and ⅝ in. x 4 ft. spaced 3 ft. at longitudinal joints. Total steel 1498.77 lb. per 100 ft. of 20-ft. pavement. Expansion joint every 50 ft.
10'
10'
10'
3'
½" per ft. normal section
¾" " " banked "
Dowels 4'-0⅝" deformed
6"
2" loam or top soil
Use 4:1 slope wherever possible to eliminate guard rail
4:1 slope
Earth fill
2" loam or top soil
6" gravel base course 37.04 cu. yd. per 100 lin. ft. per cent of wear not over 18
No roadway excavation under pavement in top 24" of fills. All fills of 18" or less under 6" base course shall be gravel borrow
Gravel base to be outletted through shoulders every 200'
Reinforced Concrete
10' (min. 3')
10'
10'
3'
5'
Old ground line
½" per ft. normal section
" " banked "
3" bituminous macadam trap rock 0.166 tons per sq. yd.
4" broken stone base course 0.22 tons per sq. yd.
6" gravel base course per cent of wear not over 18; 0.166 cu. yd. per sq. yd.
2" loam or top soil
Use 4:1 slope wherever possible to eliminate guard rail
1" crown
4"
3"
2" loam or top soil
Earth fill
4:1 slope
Fills under 6" gravel base shall be gravel borrow, per cent of wear not over 18
Gravel base to be outletted through shoulders every 200'
Bituminous Macadam

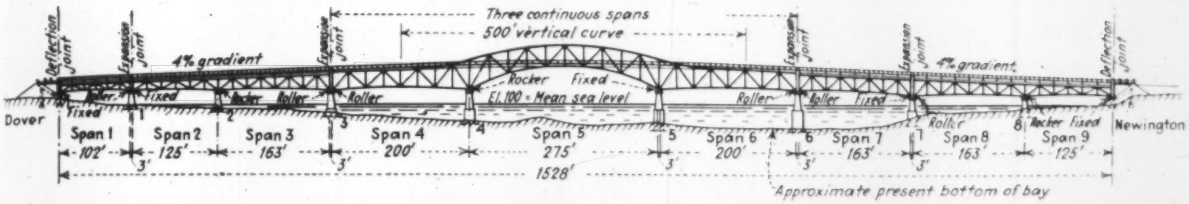


FIG. 4—DIAGRAM ELEVATION of Little Bay Bridge, showing span grouping and principal profile features.

was closed. Inside this wall a second wall of arch-web sheetpiles was driven and stiffened by waling. With this construction the cofferdams proved remarkably tight and were pumped out and excavated by ordinary processes. The pier base was concreted against the inside sheeting as a form; the outside sheeting was pulled.

Piledriving for the cofferdams was practicable only during an interval at the turn of the tide. During the full flow of flood and ebb the current swept away anything that was not fast and strong. An indication of the rip and turbulence of the current is given by Fig. 8, which shows a part of a guide frame for sheeting in process of erection.

A 1:2:3½ gravel concrete was used for the base and core of the pier. A barge was rigged up with bins and a portable mixer, which discharged into buckets handled by derrick boat to the pier. As stated, the cofferdam sheeting was the form for the base; the granite masonry built up ahead provided the form for the core concrete. The barge received its materials from cars on the railway trestle of the old toll bridge (Fig. 2). The substructure was completed and turned over to the steel contractor on Jan. 23, 1934.

Erection of superstructure

The contractor for the substructure had constructed pile and timber ramps on the center line of the new bridge extending from the Dover abutment to pier 3 and from the Newington abutment to pier 7. An arrangement was made for the superstructure contractor to take over these ramps for use as falsework for the erection of spans 1, 2, 3, 8 and 9. Blocking and timber bents set on the ramps were used to bring the falsework up to the proper elevation to support the steel for these spans.

Steel shipments from the contractor's shops arrived in Dover beginning early in January and were so arranged as to insure a continuous erection operation. Two 10-ton steel derricks were set up, one at each abutment, and all preparations were made to start the erection of the steel as soon as the substructure was completed. Steel erection was started on the Dover side Jan. 23, and on the Newington side three weeks later. The steel was hauled by truck from the storage yard for spans 1, 2, 3, 7, 8 and 9, transferred to pushcars on rails at the abutments and hauled out to derricks traveling out on the steel structure as it was erected.

Span 1 (a simple span) and spans 2 and 3 (continuous spans) were erected without any unusual difficulty, although the extremely cold weather made it impossible to maintain the erection schedule. Spans 8 and 9 were continuous spans and duplicates of spans 2 and 3. Span 9 and one-half of span 8 were erected when a sudden warm spell and heavy rains, with the high tide, broke up the ice for a short distance above the bridge. On March 7 the ice carried away the ramp for span 8, and it floated downstream about 600 ft. close to the old Boston & Maine Bridge, when the tide reversed and carried it back upstream past the new bridge and washed it ashore about a mile up the bay. The engineers and contractor then concluded that it was unsafe to proceed with the erection until the ice had gone out and the job was shut down.

Erection operations were resumed on April 9, 1934. A tower of steel piles and bracing was erected at the center of span 8, and the rest of this span was erected by the cantilever method. Span 7, a simple plan, was erected by the cantilever method by providing necessary connections at the top and bottom chords to span 8 over pier 7 to make the structure continuous over this pier. After erecting one-half of span 7 by the cantilever method the tower used for span 8 was used at the center of span 7. The erection then proceeded by the cantilever method to pier 6.

Spans 4, 5 and 6 were a continuous structure. The high tide and swift current and also the bare-rock streambed made the use of falsework for spans 4 and 6 impracticable. Spans 4 and 6 were placed by the floating method. Two deck scows 30x110 ft. (Fig. 9) were moored alongside span 3, and steel falsework was placed on them so that span 6 could be completely erected and riveted, except for a portion of the deck steel. Tugs were used in placing the completed span on the piers, as, due to the unusual stream conditions, it was not considered safe to handle the barges with runner lines. Span 4 was erected

FIG. 6—EXPANSION-JOINT design for reinforced-concrete deck structure of the Little Bay Bridge.

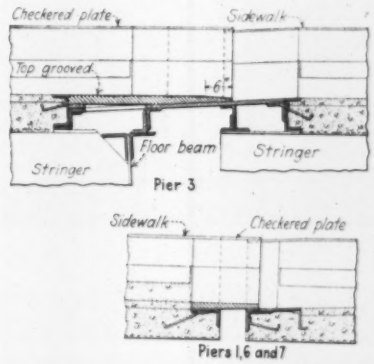
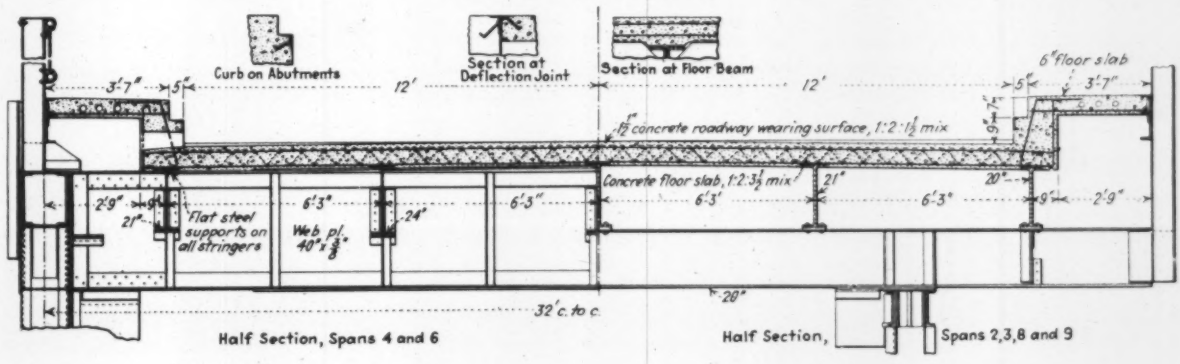


FIG. 5—BRIDGE ROADWAY sections, showing heavily reinforced-concrete deck with integral concrete wearing surface.



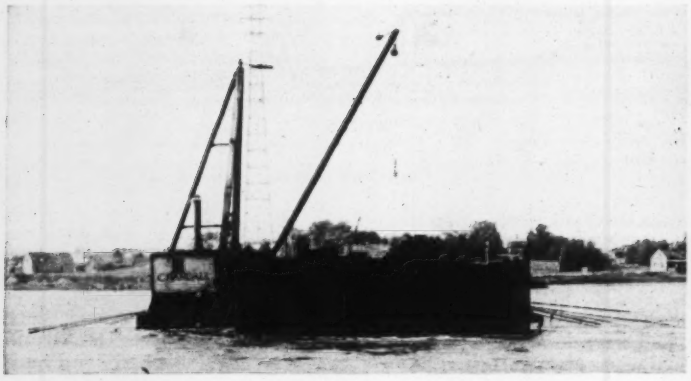


FIG. 7—BARGE PLANT constructing steel sheetpile cofferdam for deep-water pier. An inner wall of arch-web sheetpiles provided the form for the concrete pier and was left in place.

FIG. 8—SWIFT TIDAL current is indicated by the turbulance around the pilot piles for a cofferdam. Pile driving was practicable only during intervals at the turn of the tides.

and placed in the same manner as span 6. After spans 4 and 6 were placed on piers, the derricks on spans 3 and 7 moved out over spans 4 and 6, filling in the portion of that steel not erected with the spans on the barges.

Cantilever center span

Span 5 was erected by the cantilever method by both derricks moving out on the floor system as steel was raised. In order to provide clearance for erecting the closing pieces at the center of span 5, the shoes for spans 4 and 6 at piers 3 and 6 were provided with shims so that these points were sufficiently lower than their permanent location to raise the center of span 5 enough to enter closing pieces. Riveting in span 5 was carried on as erection proceeded, following up the erection very closely. Before riveting span 5 at the center, the ends of spans 4 and 6 at piers 3 and 6 were jacked up to proper elevation, and the necessary shims were placed under the shoes. Jacking girders were provided by the design for this purpose. In order to insure reactions for spans 4, 5 and 6 being as calculated in the design of the structure, proving rings were used to weigh the reactions for spans 4 and 6 at piers 3 and 6, and the shims under the shoes at these points were adjusted to suit.

The steel for spans 4, 5 and 6 was handled from the storage yard on cars out on the old B.&M. Railroad bridge to the point where it could be loaded on a barge with the locomotive crane and then transported to the new bridge and handled by the derrick into position direct from the barge.

For placing the concrete deck, a mixing plant was set up at each abutment. Forms and reinforcing steel, shop-welded into mats the full width of the roadway and about 7 ft. wide, were placed for the three spans at each end, and the concrete was hauled out in trucks over planked runways laid on the welded mats. This operation was carried on during the erection of the steel for spans 4, 5 and 6. The concrete deck for spans 4, 5 and 6 was placed in a similar manner, working both ways from the center of span 5. The roadway curbs and sidewalks were placed after the roadway deck as a separate operation.

FIG. 9—FLOATING a 200-ft. side span of Little Bay Bridge into position to seat on piers as the tide ebbed; the span was erected on barges moored near the piers.

Direction

The bridge was constructed for the New Hampshire Toll Bridge Commission as a PWA project with Fay, Spofford & Thorndike, Boston, Mass., as engineers. The contractor for the substructure was the Crandrall Engineering Co., Cambridge, Mass., and the contractor for the superstructure was the Lackawanna Steel Construction Corp., Buffalo, N. Y. The roadwork was carried out under the direction of the New Hampshire highway department, of which F. E. Everett is commissioner and D. H. Dickinson chief engineer.

Tests on Nailed Joints Provide Data on Strengths

Usual construction conditions simulated in test series—Results show load-deformation relation and safe carrying strengths—Comparison between timber and plywood indicated

By J. B. Wells
Associate Professor of Civil Engineering, Stanford University

ALTHOUGH the lateral strength of nailed joints is an important consideration in the design of wooden structures, particularly in a region subject to earthquakes, the author has been unable to find any published data that cover the subject of deformation of nailed joints in a practical and comprehensive way. Available test results on the strength of nailed joints do not go into the load-deformation relation. Hence, a series of tests was made at Stanford University to measure deformation and ultimate strength in various nailed joints. Every effort was made to use materials and methods that would make the tests conform to usual construction conditions; it was desired that the data compiled should conform as closely as possible to results that could be expected in practice. About 175 nailed joints were tested and constitute the basis for the figures given in the following.

All lumber used was Douglas fir, surfaced on four sides. No attempt was made to get material better than ordinarily is obtained in a lumber yard. The quality used probably would be classed as "select common." Moisture determinations run on several specimens showed the moisture content to range between 10 and 16 per cent, based on oven-dry weight. The average density of the lumber was 0.49, the values varying from 0.39 to 0.57. All joints were made up with lumber of ordinary sizes and were nailed with common wire nails except that in testing plywood, galvanized, cement-coated and barbed nails were used in addition to the common variety. Each joint was constructed of three pieces, a thick central block with a thinner piece nailed on each side.

In all cases the central block was of sufficient thickness so that the nails driven through the board on one side did not pass entirely through to the board on the opposite side. Thus, all nails were in single shear. Four nails were used in each joint, two on each side of the central block. The side pieces projected far enough below the center block (Fig. 1) to make ample allowance for deformation or slipping of the joint. Each test was made by putting a specimen in the testing machine and applying a compression load to the central block. Deformations were read to 1 one-thousandth of an inch by means of an Ames dial head fastened to the central block and bearing on the table of the testing machine. The head of the testing machine was run down at the rate of 0.05 in. per minute, and deformation readings were taken at varying load intensities depending on the size of the nails under test. Most of the tests were made with the load applied perpendicular to the grain of the wood, although a few were conducted with the load parallel to the grain. The difference in the values obtained by the two methods of loading was not enough to warrant making a separate series of tests with load parallel to the grain.

The values given in the accompanying curves in each case represent the average of five specimens, each containing four nails. Table I gives the dimensions of the nails tested, which check, practically, with similar dimensions given in handbooks.

Fig. 2 shows the results of tests using nails from 8 to 40d. sizes. The

FIG. 1—SECTIONAL VIEW of three specimens, indicating progressive deformations resulting from loading shown in Table II.

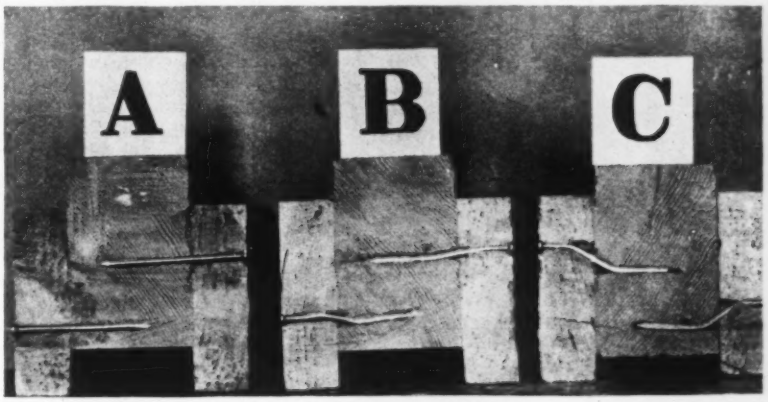
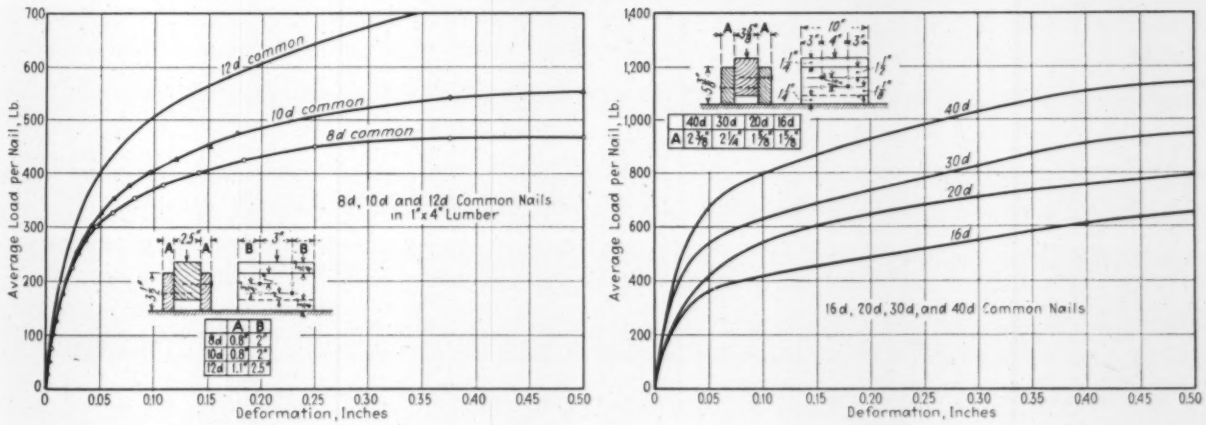


FIG. 2—DEFORMATION CURVES for 8, 10 and 12d. nails (left) and corresponding values for 16, 20, 30 and 40d. nails (right).



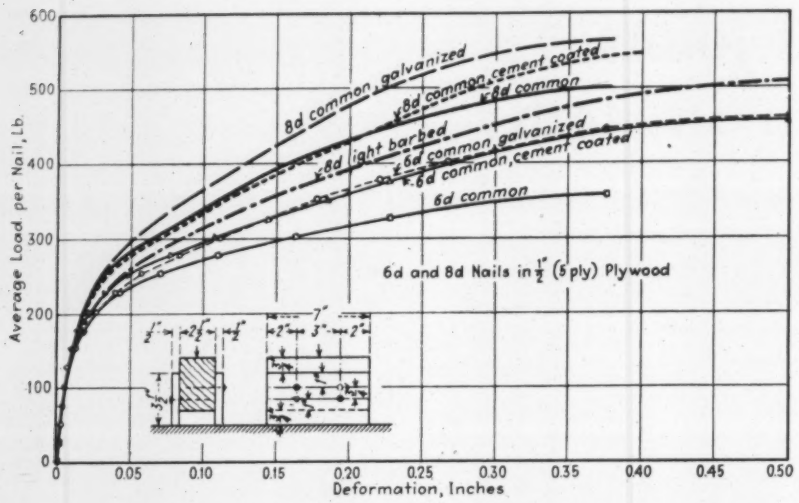


FIG. 3—DEFORMATION CURVES for 6 and 8d. nails in plywood.

dimensions of the blocks used in making up the specimens, as shown by the sketch on the curve, were selected to suit the size of the nails under test. Joints involving the use of 8 to 20d. nails, inclusive, had the load applied in increments of 25 lb. per nail up to a deformation of $\frac{3}{8}$ to $\frac{1}{2}$ in. Joints made up with 30 and 40d. nails had their loads applied in 50-lb. increments per nail up to a deformation of $\frac{1}{2}$ in.

TABLE I—NAIL MEASUREMENTS

Nail Size	Length (in.)	Diameter (in.)	Nail Size	Length (in.)	Diameter (in.)
6d.	2	.113	16d.	3½	.163
8d.	2½	.134	20d.	4	.192
10d.	3	.148	30d.	4½	.206
12d.	3¼	.148	40d.	5	.226

TABLE II—LOADS PER NAIL ON SPECIMENS SHOWN IN FIG. 1

(20d. nails used in all specimens)

	Load Lb.	Deformation, In.	Permanent Set, In.
A	500	0.105	0.061
B	750	$\frac{1}{4}$	$\frac{1}{8}$
C	800	$\frac{1}{2}$*	$\frac{3}{4}$

*Practically complete failure.

Fig. 3 shows the results of tests on joints made up with 6 and 8d. nails driven through ½-in. 5-ply plywood. In both cases the load was applied in increments of 25 lb. per nail up to the failure of the joint. The smaller deformations seem to result from the crushing of the wood fibers under the nail. As the deformation increases the heads of the nails tend to sink into the wood, also the nails bend and begin to pull away from the central block into which they are driven.

Because the conditions under which nailed joints are used in practice vary widely, no attempt has been made to work up a general equation from these curves or to give recommended working values. These are matters for exercising the judgment of the engineer in applying the data given herewith. For example, a nailed joint carrying a dead load that is very large in proportion to the live load would require a working stress different from that appropriate for a joint subjected to rather high loads applied only intermittently. Also nailed joints subjected to vibration and to shock naturally should be designed with much more conservative working values than joints subjected to quiescent loads.

Practically all of the curves show quite a definite break or point beyond which the ratio of deformation to load changes rapidly. This point is somewhat similar to the yield point found in ordinary testing of metals. In the region where the curves flatten out it is difficult to get exact values because the joint continues to deform and to yield under sustained load. It is believed that these curves cover the range of material used in common practice, but the author would not advise using values obtained from these curves for thickness of material much greater than shown. From a few additional tests on thicker material, however, it appears that an increase of 25 per cent in the thickness of the side pieces would not materially decrease the strength of the joint. There doubtless is a point beyond which the strength of the joint will decrease quite rapidly with increase in thickness of members connected. This is something that should be investigated further.

From experience that the writer has had involving the use of plywood, he believes that this material, because of its superior resistance to lateral forces, will come into more general use in future as an outside sheathing for wooden-frame buildings. When ½-in. plywood is used for this purpose carpenters seem to prefer to use 6d. nails rather than 8d. nails to fasten it to its supporting frame. This is probably because the carpenter, being accustomed to ordinary lumber, fears there would be danger of splitting such thin material with the larger nail. However, from the author's experience, 8d. nails can be used with perfect safety in ½-in. 5-ply plywood and, as they will give a stronger connection, it is believed that nails of this size should be used when lateral forces are to be resisted.

Four tests were run with 20d. nails to determine the permanent set occurring under different loads. For example, a load was applied to the joint, the deformation under this load was read, then the load was released, and the deformation again was read. In general, it was found that in the working range of the joint the permanent set amounted to about 40 per cent of the deformation occurring under the load. That is, if a 20d. nail carrying a load of 200 lb. deformed 0.02 in., removal of the load resulted in a permanent set or remaining deformation of 0.008 in. This permanent set doubtless results from two causes: (1) crushing of the wood fibers under the nail, and (2) friction between adjacent wood surfaces, which tends to prevent the joint from springing back to its original position.

The nails for these tests were of standard stock and were furnished by the Columbia Steel Co. J. A. Blume, a graduate student in the civil engineering department of Stanford University, conducted a large part of the laboratory work.

Applications for Power Projects Aggregate 7,493,000 Horsepower

POWER PROJECTS, covered by applications pending or granted by the Federal Power Commission to the end of the last fiscal year, June 30, 1934, aggregate about 7,493,000 primary hp., with a proposed ultimate installation of 18,225,000 hp., according to the quarterly report of the commission, submitted by Frank R. McNinch, chairman to President Roosevelt.

Seven applications for permit or license which were received during the last quarter of the fiscal year involve 52,300 primary and 322,700 ultimate hp., bringing the total number of applications filed since the commission was created up to 1,276. Collections from licensees during the last fiscal year totaled $570,908.

Chairman McNinch also reported that the National Power Survey, directed by Executive Order of August 19, 1933, and the Electric Rate Survey authorized by Congress April 14, 1934, were well under way with technical staffs working under the general supervision of Basil Manly, vice-chairman of the commission.

A National Water Policy in the Making

Problems involved in a comprehensive study of our water resources as revealed by a review of the early work of the Mississippi Valley Committee—Policies formulated as to flood-control projects to be financed in part by the PWA

By Carey H. Brown

Superintendent of Engineering and Maintenance, Kodak Park Works, Eastman Kodak Co., Rochester, N. Y. (Formerly Secretary, Mississippi Valley Committee, Public Works Administration)

TREMENDOUSLY EMPHASIZED by the great drought of the past summer, water problems have come into commanding prominence in national development and policy matters. Now it appears that, as the result of a remarkable series of events, there is prospect that a comprehensive national water policy may be formulated in the near future. This work was inaugurated when the Mississippi Valley Committee, formed just a year ago by the Public Works Administration to investigate applications for PWA aid in building flood-control projects, began a broad study of water-resource problems in the Mississippi Basin after it had found that flood control could not be considered by itself. This spring a rapid reconnaissance of the water resources and potential uses to which water may be put in the major drainage basins of the country, made by departmental boards at the President's direction, further demonstrated the necessity of a thorough survey of water resources and of improvement projects. The preliminary report of that committee was summarized in our issue of Sept. 13, 1934, p. 340, and the first report of the Mississippi Valley Committee (now the water resources section of the National Resources Board) is expected to be made early in October. As that committee is the first to get down to a detailed study of the many angles of the water-use problem, the following statement by Carey H. Brown, first secretary of the committee, is especially pertinent. —EDITOR.

THE FLOOD of requests for funds which poured in on the newly organized Public Works Administration in Washington last summer included an astounding number of proposals for the erection of stream-control works of one kind or another in various localities throughout the country.

In almost every instance these requests contemplated construction entirely at federal expense. Requests for 100 per cent federal financing of flood-control or water conservation projects had no justification in law other than in the Recovery Act itself, since the federal government has never recognized responsibility for such construction. Prior to the passage of the Recovery Act, the United States government had participated in flood-control work only on the Mississippi River, where it undertook responsibility for construction upon rights-of-way furnished by local agencies, and on the Sacramento River, where a division of costs as between the federal government, the state and local districts had been agreed upon and written into law.

However, it was a matter of common knowledge throughout the country that the Corps of Engineers, U. S. Army, was authorized by Congress in 1927 to prepare reports on all navigable streams as to the feasibility of works for navigation, flood control, irrigation and water power. These studies, taking their name from the numbering of the Senate resolution that authorized them, are known as 308 reports. In providing for their preparation, Congress, of course, did not intend to recognize federal responsibility for developing flood control, irrigation and water-power facilities in all these streams. Navigation works only have been generally recognized as a purely federal responsibility. However, the fact that the federal government had undertaken these studies was urged as a reason—or a basis of hope—that Uncle Sam, particularly at the time when he was seeking to develop new and additional public-works projects to provide employment, would undertake construction of flood-control and allied projects on a broad scale and entirely at federal expense.

Mississippi Valley Committee

With few exceptions, the projects for which PWA allocations were sought are located within the Mississippi drainage area. Generally speaking, it is in this section of the country that flood damage is most prevalent and the need of river-regulation works most pressing. The problem is of great importance as affecting the general economic stability of large areas.

To consider these various requests, Administrator Ickes, in September, 1933, designated within the PWA a group known as the Mississippi Valley Committee. The function of this body as initially defined, was the consideration of requests for funds for flood-control and allied projects in the Mississippi area. Later its function was expanded to include general planning with reference to water conservation and control.

As originally appointed, the committee consisted of six members, since increased to eight. The committee now consists of Morris Llewelyn Cooke, consulting engineer, Philadelphia, chairman; Prof. Harlan H. Barrows, geographer, University of Chicago; Herbert S. Crocker, consulting engineer, Denver; Prof. H. Solon Graves, director of the School of Forestry, Yale University; Maj.-Gen. Edward M. Markham, Chief of Engineers, U. S. Army; Charles H. Paul, consulting engineer, Dayton, Ohio; Harlow S. Person, consultant in business economics and management, New York City, S. M. Woodward, professor of mechanics and hydraulics, University of Iowa, Iowa City. In the absence of General Markham, Lieut.-Col. Glen E. Edgerton represents the Corps of Engineers on the committee.

Because of the particularly pressing nature of the problem in the Arkansas and Red River basins, subcommittees designated respectively as the Arkansas Basin Committee and the Red River Committee were appointed for the purpose of considering the problems of these streams and reporting to the Mississippi Valley Committee thereon. The subcommittees each included a representative from each of the states affected.

Since there was no specific legal

MEMBERS of the Mississippi Valley Committee, now the water resources section of the National Resources Board. Left to right, Harlan H. Barrows, Major General Edward M. Markham, Lt. Col. Glen E. Edgerton, Herbert S. Crocker, Morris L. Cooke, chairman, Sherman M. Woodward, Henry S. Graves, Harlow S. Person, Chas. H. Paul.

basis or established policy governing federal participation in flood control and water conservation, the committee was faced with the necessity of determining matters of policy and of considering the general aspects of the problem as well as the merits of specific projects.

It is not the purpose of this article to give a chronological account of the committee's action, and will therefore pass to a statement of certain facts and views regarding the problem, more or less irrespective of their relation, in time at least, to action upon specific projects. In other words, the problem will be dealt with as a long-term planning problem—which in reality it is—although the committee was originally designated for the specific purposes of passing upon individual projects. The reasons for such treatment I hope to make plain.

It is a matter of common knowledge that large areas of both urban and farmland in the Mississippi drainage area and elsewhere are subjected, from time to time, to the destructive ravages of floods. No dependable estimates of the total of such damages are available, but the figures are large. Uppermost in our minds at this writing in August 1934, are the ravages of drought, whereas but a year ago impassioned presentations of the perennial danger of floods were being made to the PWA. The situation is ironical, but illustrative of the importance of the water problem—be it one of too much water or too little. The damage caused by flood and drought, however, while not to be minimized, is intermittent and probably far less, in the long run, than the more insidious ravages of soil erosion, whose destructive force is constantly at work over two-thirds of the entire Mississippi Basin.

By authorizing the 308 reports and by its action relative to the Mississippi and other streams, Congress recognized the obvious interrelation of flood control and navigation, irrigation and water-power development. In appointment of the Mississippi Valley Committee and recognition of the committee's problem in its broader aspects, the Administrator of Public Works has recognized the further relation to these matters of the kindred subjects of soil erosion, forestation and water supply for domestic and industrial uses. All of these are comprised in the general term, "water conservation and control," which we may consider to be the core of the committee's problem.

Rising importance of water

About half of the United States is arid or semi-arid in character. *Certainly in such sections of the country, and possibly in the United States as a whole, there is greater need for water under present conditions of development than under the conditions which existed at the time of the first white settlement.* However, by encroachments upon natural flood areas, by drainage of swamps, ponds and lakes, by undue diversion of water to arid areas, and by the destruction of forests and other ground cover, we have decreased the amount of water storage normally available and have correspondingly increased the problems arising from rapid runoff. In general, up to the present it appears that our development of water resources has, in many respects, been illogical and unsound.

In passing the legislation providing for the 308 reports, Congress recognized the necessity of federal *planning* for water conservation and control. However, such federal interest in planning, and the inclusion of projects in the 308 reports, by no means implies approval or even consideration of such projects for federal *financing*. It is merely an evidence that the interstate character of the problems involved, or the relationship of the stream to navigational or other federal interests, indicates necessity for federal planning and control.

Water a national asset

Water resources in general are coming to be looked upon as a national asset whose development must be considered from a national point of view. Such an attitude need not involve a bureaucratic handling of this problem, neither will it create federal responsibility for solution of purely local problems. However, the necessity of adequate water for domestic use and for various other essential purposes, and the obvious limit upon the supplies available indicate the propriety of considering water resources in the nature of a public utility to be developed for the greatest common good.

Prior to passage of the Recovery Act and the legislation providing for the Tennessee Valley Authority, the federal interest in streams related in general to navigational projects alone and to projects carried out under the reclamation law. Exceptions were the specific cases of flood control on the Mississippi and Sacramento Rivers, power development at Muscle Shoals on the Tennessee, and such specially legislated applications of the reclamation law as Boulder Dam. By far the major participation of the federal government in water projects has been by way of work undertaken in the interest of navigation. However, great numbers of projects undertaken ostensibly in the interest of navigation have great value from other points of view—as witness the bank protection on the Mississippi and dikes on the Missouri which have prevented the destruction of farmlands, power developments installed at navigation dams, etc.

Various examples of this byproduct use are available. In fact, the byproduct value in some cases probably exceeds that of navigation; but in view of the legal situation whereby federal improvement of rivers has in general been restricted to projects for the benefit of navigation or irrigation, it has been essential that all structures be founded, in theory at least, upon those bases. The obvious relation between these and other types of water use, only partly recognized by Congress in providing for the 308 reports, indicates the desirability of doing away with the legal fiction that the federal government is interested in streams from these standpoints alone.

Reasons for advance planning

Through navigation surveys approved by Congress, the navigation *plan* has been built up far in advance of the actual development of waterways. That this navigation plan has been effective otherwise than purely as a guide for waterway development is evidenced by the action of the War Department on bridge permits. All such permits relating to navigable streams are regulated in accordance with the proposed ultimate navigation improvement. However, while planning has legally formed a basis for decision as to proper bridge clearances for purposes of *navigation*, we have not heretofore foreseen the necessity for similar provision with reference to bridge heights or locations, highway routes, etc., which might interfere with other appropriate water-use structures. Practically every sizable reservoir project in the country faces, as a main difficulty, the expense of land acquisition and of the removal of highways, bridges, railroads and other improvements. The present need for such removal could not have been entirely foreseen, but if we are now to develop a coordinated plan for water use for the future, we must take steps to avoid future interferences of this nature with its execution.

The Industrial Recovery Act permitted the PWA to make allocations for river and harbor projects approved either by Congress or by the Corps of Engineers. Under this provision many millions of dollars have been allocated for navigation improvements on various streams, as well as large sums for flood control on the Mississippi and minor sums applicable to the Sacramento in accordance with previously approved legislative policy. Allocations were made for the Fort Peck Dam on the Missouri River based upon the benefit to navigation by regulation of flow in the Missouri River.

The allocation for construction of Bonneville Dam on the Columbia was not based solely upon prospective navigation benefits but was made under the general provisions of the Recovery Act, vesting wide discretion in the PWA. Though constructed primarily for power generation, the dam includes provision for locks for ocean-going vessels.

Aside from the consideration of certain levee projects on the lower Mis-

sissippi, the Mississippi Valley Committee was not concerned with the allocations above specifically referred to, since such allocations were made either prior to the creation of that committee or during the period when the committee was limited to the consideration of flood-control projects alone.

Factors in a water policy

In view of the extent of the flood-control problem, the committee was faced, in its consideration thereof, with the necessity for formulation of a policy that might be consistently adhered to by the PWA and might also later form the basis for a permanent policy. Consideration of the varied projects that were dropped into the lap of the committee at its creation led to formulation of the following tentative conclusions:

1. Measures that might be entirely practicable and suitable to provide local flood protection often will be found to exercise no more than a purely local effect, and may even, as by the construction of continuous levees and the elimination of ponding, actually increase hazards farther downstream.

2. While the 308 reports, when available, contain recommendations as to general location and design of suitable flood-control works, these designs are insufficiently developed in the majority of cases to enable work to proceed promptly. Furthermore, the delay incident to securing rights-of-way will be most serious in many cases, and the cost of acquiring land will divert unduly large sums from the fundamental purpose of creating employment under the PWA.

3. The magnitude of the problem, considering the Mississippi drainage area as a whole, appears to be measured by a cost running into billions. Therefore, aside from constitutional questions as to federal and local responsibility, there exists a grave fiscal problem. Furthermore, the studies covered by the 308 reports, while indicating projects that would be suitable for individual streams, have not proceeded to the point where they indicate the relative importance of these projects to the valley as a whole. Assuming, therefore, that a program of any specific size short of the whole might have been decided upon, it is impracticable to select such a program from the data available. This conclusion was substantiated by the findings of the President's waterflow committes, which, when faced with the problem of promptly selecting a balanced program of ten water projects, found the comparative data inadequate to justify selection of such a program.

4. Since projects, so far as the PWA program is concerned, therefore must proceed individually, each upon its own merits, and with the federal government as a participating rather than a sole financing party, the problem must be sponsored by some local, legally constituted agency, such as a conservancy district, with legal authority to conduct work and to contract with the United States.

5. This local agency must in general furnish all necessary rights-of-way, agree to bear the cost of maintenance and operation, and save the United States free of all claims for damages. In addition, the local district must bear some proportion of the actual cost of construction, this proportion to be determined in the particular case in accordance with the relative extent of local and general benefits.

Application of the principles

In applying these requirements to specific projects of flood control, the committee faced very difficult problems. For example, no formula for computation of "general benefits" of a flood-control project had been devised. Legislatively, benefits to navigation only have been recognized as general benefits, whose cost therefore may properly be allocated to the federal government. The extent to which flood-control benefits may be considered general, and the extent to which they must be considered as purely local, is a matter very difficult of determination. It is obvious that a project that exercises definite effect upon flood heights of the Mississippi proper, the Missouri or the Ohio, differs as to general benefits from a project that has no effect upon interstate streams, or whose effect, on the other hand, may in fact be adverse.

The project of the Muskingum Valley Conservancy District in Ohio, as approved for allotment, exemplifies the committee's policy. The Muskingum is a navigable stream, improved by locks and dams. The requirements as to local sponsorship were followed in that the local district, organized under the laws of the State of Ohio, agreed to furnish all necessary lands and rights-of-way and recognized as a local responsibility the construction of purely local flood-protection work such as levees and bank protection. The United States, on the other hand, on the basis of a determination by the committee that the proposed system of reservoirs would *benefit navigation* and also serve to control floods of the Muskingum, would materially reduce flood heights on the Ohio River as far as Cairo, and otherwise would materially benefit a widespread and indeterminate area, agreed to construct the reservoirs upon the land so furnished by the district.

Considering the project as a whole, while the division of expense was not arrived at on a percentage basis, it happens that of an ultimate cost of about $45,000,000, approximately one-half is to be borne by the United States and the remainder by local agencies. The immediate contract provides that local agencies supply only the necessary lands and rights-of-way and perform certain incidental construction in erection of the reservoirs; but ultimately local flood-control works, if erected at all, must be financed by local agencies, the United States having assumed its full share of the cost in connection with initial construction of the reservoirs.

The fact that no additional projects similar to the Muskingum were submitted is evidence of the failure heretofore to develop adequate water-conservation legislation in the various states. Ohio's law dates back to the disastrous flood of 1913, subsequent to which the conservancy law was passed for the purpose of dealing with the Miami district. That outstanding project, undertaken at the expense of the local community, has been an inspiring example to other localities where flood damages have occurred. A few other states have similar laws permitting the creation of conservancy districts, but generally speaking such legislative authority is woefully lacking.

Interstate problems

A conservancy district, created in accordance with state law, is obviously a suitable agency for the execution, either with or without federal assistance, of water-conservation and control projects on *intrastate* streams. No successful plan has yet been developed for the handling of *interstate* projects other than through federal assumption of at least partial responsibility. The fact that a project is interstate in character should not necessarily create federal responsbiility for its execution, for in many cases the benefits will be largely, if not entirely, local in character. However, the difficulty of securing effective cooperation of two or more states is illustrated by many problems that have arisen in the past, and it consequently seems desirable that federal planning, and to a certain extent federal control, apply to those projects which are interstate in effects or location. The development of better machinery for the cooperation of states under federal supervision in the execution of such projects remains to be worked out.

As illustrative of this situation, the committee is at present concerned with the flood problem of the Kansas Cities, which is an extremely serious one. Here, not only is legislation needed to permit formation of a conservancy district, but laws must be enacted in both Kansas and Missouri, and possibly also in Congress, to permit cooperation between the two states in a problem affecting both.

The work now broadened

While serving in an advisory capacity to the Public Works Administration, the committee conducted studies of various water use and control projects in the Mississippi Valley. It is to this phase of its work that what has been said heretofore mainly relates. However,

through a recent executive order of the President, the committee has become the water resources section of the newly created National Resources Board and is now charged with the additional task of making an inventory of water resources of the entire United States, with the formulation of a long-time plan for the wise use of these resources, and with the provision of policies for their coordination and control. Harbor waters will be included in this study.

In its few months of existence the Mississippi Valley committee naturally has made but a small beginning on the solution of its large problem. Like other phases of planning, planning of water conservation and control must necessarily be a continuous process. It is not practicable within *any* fixed period of time to prepare a plan that will properly regulate development indefinitely into the future. The needs, the available data and judgment as to the best solution will vary from year to year. Plans, therefore, while adhering to comparatively fixed principles, must be modified from time to time as necessary.

Studies and Reports

The technical data forming a basis for the committee's studies are in general those contained in the 308 reports of the Corps of Engineers. PWA funds have provided a qualified technical staff. Various data gathered by the Geological Survey, the Weather Bureau and others likewise have been utilized, and allocations of funds for certain specific investigations have been made to the Mississippi Valley Committee or to agencies designated by it. Among the latter is an allotment for study of rainfall and runoff, carried out mainly by the Geological Survey, in which committees of the American Society of Civil Engineers and the American Geophysical Union have cooperated. Groundwater studies under the auspices of the committee were also undertaken, in the area including part of the Dakotas and adjacent states, where the water problem is especially severe. Various other special studies have been undertaken.

Since the committee was initially concerned with the Mississippi Valley, the report on that area will logically be the first released. Such release is scheduled for Oct. 1 of this year. Without speculating as to how complete this report will be, it is clear that it will include the topics of flood and low-water control, navigation, water power and fuel-produced power, irrigation, forestation, erosion, water supply and sanitation. Further, this report may be expected to be a correlation of the 308 reports and other engineering data with the results of geographic and social studies, carried on in the realization that planning is not designed on the basis of ton-miles or kilowatt-hours alone but must include a comprehensive study and review of the physical and social aspects of all the problems involved.

The committee's report on the Mississippi Valley and its further reports to follow should therefore constitute a lasting contribution of the Public Works Administration, a contribution quite as important as physical structures now being erected by public-works funds. Whether or not development of a more definite and comprehensive national policy of water conservation and control will spring from the activities of the committee remains to be seen. Its work may be expected to form a reasonable basis for decisions as to the need of such a national policy, even if not a basis for the policy itself.

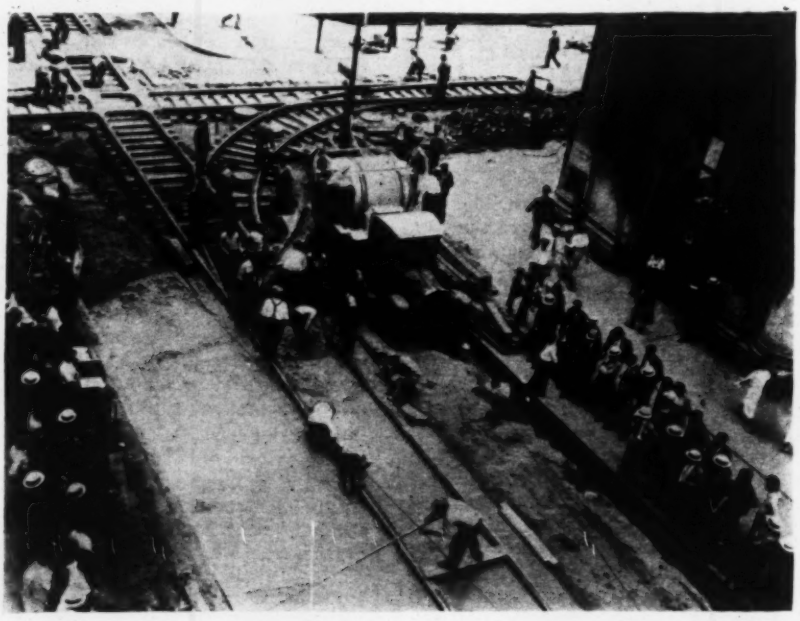
Paving with De-Aired Brick in Philadelphia

Busy Chestnut St. in Quaker city being repaved with de-aired brick following most recent practice of using cementitious cushion and a calcium chloride wash to protect surface from surplus filler asphalt

DE-AIRED PAVING BRICK is being used on recent repaving of Philadelphia streets as NRM projects under the direction of the state highway department of Pennsylvania. The work is of interest as a prominent example of the growing use of the new brick and as representing the latest improved practice in bedding the brick, filling the joints and producing a clean brick surface. By these methods remarkable accuracy is being secured in surface profile and riding smoothness, and the tractive value of clean brick surface is had from the start of traffic over the pavement.

To illustrate the pavement structure and the construction procedure, a specific operation—the repaving of Chestnut St.—is described. The new pavement extends on Chestnut St., from 5th to 13th Sts., a distance of 3477.1 ft., or nearly two-thirds mile. The street is traversed by a single-track street railway which at five intersecting streets has straight crossings with other single tracks and at four streets has straight crossings and one route interchange curve. The tracks have wood ties resting on the subgrade and embedded in the concrete base to a height of 3¼ in. below the tops of the girder. This construction is shown by Fig. 2 and some of the views.

FIG. 1—CONCRETE BASE for de-aired brick pavement being constructed of transit-mixed concrete.



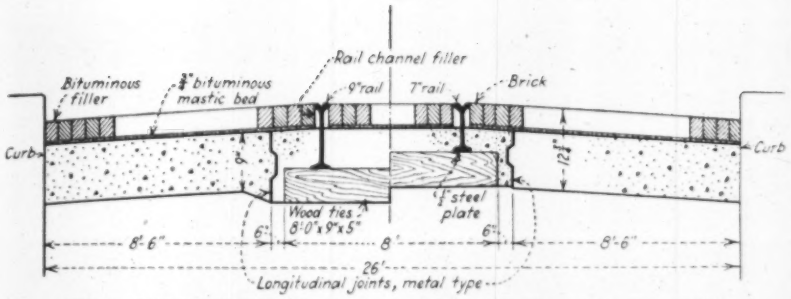


FIG. 2—PAVEMENT SECTION which was constructed on Chestnut St., Philadelphia, Pa., of de-aired brick.

The new pavement structure is shown by Figs. 2 and 3, the latter illustration showing the surface bond which is carefully arranged and controlled, particularly at cross-streets and track intersections. The bond arrangement shown by Fig. 3 is a standard plan showing a double inter-route connection; on the Chestnut St. work there are only single connections, but both types of turns are represented. All brick is laid on a concrete base on a bedding course with 4-in. face exposed.

The structural feature of the base that is of note is the longitudinal joints on each side of the track structure. The bricks are 4x8½x3 in., wire-cut de-aired brick with two ¼-in. lugs on one side. To increase end bond, the ends of the brick are double-beveled ⅛ in., as indicated by Fig. 4a, to give more end-joint space for filler. It has been found on the Philadelphia operation that these bulged ends call for very exact axial alignment of the brick rows, or a joint as shown by Fig. 4b may result. The specifications stipulated a maximum abrasion loss of 17 per cent by weight of the brick tested. The swing of the recent practice to thin cementitious cushion or bedding material is reflected in the ¾-in. bedding course of 9 per cent sand, 5 per cent asphalt or tar mix or mastic. Only 8 per cent of the sand is to pass a 100 sieve, and all is to pass the 8 sieve.

Except for the de-aired brick the pavement is less notable for structure than for the character and precision of the construction methods. The use of de-aired brick deserves some consideration as a comparatively new brick product.

De-aired brick

As used to any considerable extent, de-aired paving brick is comparatively new, although the de-airing process and its product have been established experimentally for several years. Now commercial production has been established, and out of about 55 active producers fourteen are equipped at sixteen plants to manufacture de-aired brick. Sufficient description of this material for the present purpose is as follows: In being driven by the auger machine to the forming cone and die, the clay mixture, broken up or shredded, passes into a vacuum chamber where the contained air is exhausted and from which the mixture "de-aired" is forced through the forming cone to the shaping die, whence the clay "column" goes to the wire-cutting table, and is cut into brick sizes and handled by the usual procedure.

Removal of air from the clay mixture before die-forming produces a denser and therefore a heavier brick, reduces the percentage of absorption, increases the crushing and tensile strength and decreases the rattler loss. Examination of the brick texture at breaks shows a closer grain and an absence of laminations. Some experience has been reported of increased brittleness and chipping, but the factories of whose product this criticism has been made have been able to overcome the fault by a different selection of material, specifically by increasing the silica content of the shale by the addition of sand.

Determination by independent authority of the results of de-airing has been rather fragmentary. At present the committee on brick of the American Society for Testing Materials and the Bureau of Public Roads are organizing separate investigations. For the moment, available opinion is

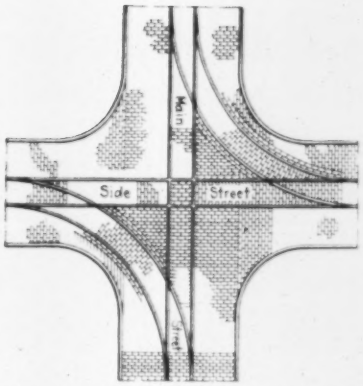


FIG. 3—BOND ARRANGEMENT of brick employed in paving Chestnut St.

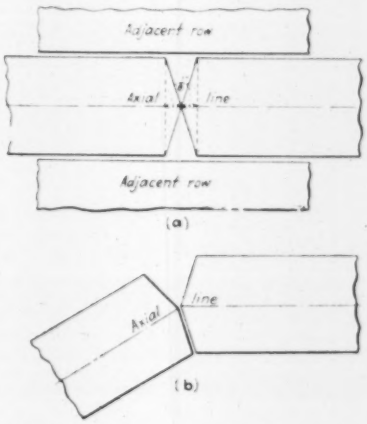


FIG. 4—BEVELED-END BRICK adapt themselves to different axial alignments.

FIG. 5—BEDDING COURSE of bitumen-sand mastic smoothed by templet to the exact profile of the surface.

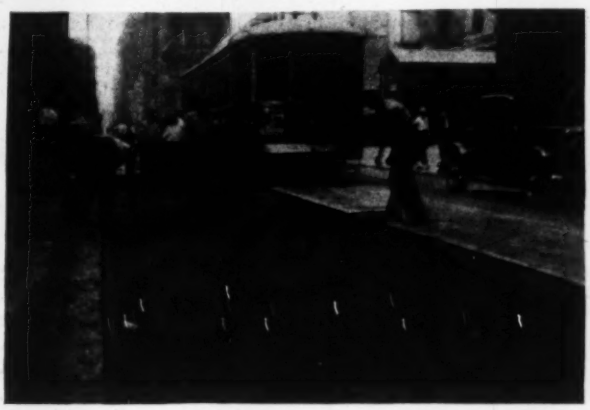


FIG. 6—BRICKLAYING proceeds from street-railway tracks to curb so as to centralize use of fractional brick at curbs.

FIG. 7—POURING asphalt filler from hand buggies and flooding it over entire surface by brooming.

FIG. 8—PEELING asphalt filler from surface of pavement after flooding has filled joints.

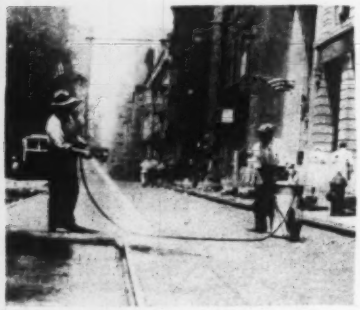


FIG. 9—CALCIUM CHLORIDE non-adhesion spray applied to brick surface before flooding on asphalt joint filler.

largely from the experience and observations of manufacturers. This indicates the following, the features which most interest the manufacturer naturally receiving the emphasis: (1) in the rattler test the de-aired brick show from 2 to 4 points less wear; (2) of the total kiln product the number of No. 1 brick (brick meeting the A.S.T.M. requirements) is increased from 2 to 10 per cent by the de-airing process; (3) the uniformity of the product is increased; (4) the weight is increased from 2½ to 5 per cent; (5) the manufacturing cost is not increased or is only slightly greater. From the manufacturers' standpoint, de-airing is an advantage.

Experience in paving with de-aired brick is too limited for definite conclusions to have been arrived at. In construction no indication is reported that they alter procedure or affect output to any material degree.

Construction methods

Returning to Chestnut St. paving, Fig. 1 and Figs. 5 to 9 show the general construction procedure. The requirement that the street cars be kept running indicated construction in longitudinal lanes, as shown by the illustrations. The base concrete was placed by transit mixers; the particular feature was the accuracy with which the surface was trued by screeding and straight-edge floats to exact crown and profile. Surety of the smoothness of the brick surface was begun in the base finish and continued in laying the bedding course.

The tar mastic was machine-mixed and shaped by templet to a depth of ¾ in. The concrete surface was swept clean before spreading the bedding, and after the mastic was smoothed it was not touched until the brick was laid. These were swept, culled and rolled in the usual manner, and the rather particular task of filling the joints and cleaning the surface was proceeded with. No filler was applied, however, when the bricks were wet or the joints contained water. Particular attention also was given to sweeping the brick; all dust that could be reached by brooms was removed.

An asphalt filler was applied by flooding it over a wash to prevent adhesion. The wash was a mixture of 35 per cent calcium chloride, 1 per cent starch and 64 per cent water proportioned by weight. It was applied by pressure sprayers as illustrated in the form of a fine spray, and with care not to penetrate the joints and so prevent adhesion of the filler between the bricks. As soon as the wash had dried out enough not to cause foaming, the hot (350-450 deg.) filler was poured on the brick and flushed into the joints until they were filled with surplus material remaining on the surface. When the filler had cooled, the surplus was peeled off by flat spade-like tools with care not to lift out the film in the joints. The material removed, with some fresh asphalt added, was reheated and again used. With the cleaning of the pavement it was opened for traffic immediately.

The construction as described did not depart from but was truly representative of the latest practices in brick paving: a truly finished base surface, a thin cementitious bedding course of exact thickness, a wire-cut, lug, 3-in. brick, rough face up, flush-filled asphalt joints and an absolutely clean exposure of brick surface. With this construction straight-edge results are secured equal to the highest requirements in modern rigid pavement specifications.

The Chestnut St. pavement was constructed under the direction of the Pennsylvania department of highways, of which Samuel Eckels is chief engineer.

Proposed Coordination of Sizes of Manufactured Building Materials

THE QUESTION of coordination of sizes of building materials has again been brought to the foreground through a proposal submitted to the Bureau of Standards involving a study of sizes of manufactured building units, especially those units which go to make up a wall system, such as brick, tile, block, windows, etc. "It is also apparent," says A. S. McAllister, chief, division of specifications, Bureau of Standards, "that variations in basic dimensions cause confusion in design and assembling and result in increased costs.

Investigation into the many factors involved in the present complicated situation, indicates that the most satisfactory results for all concerned might be obtained by taking the standard common brick dimensions (8x2¼x3¾ in.) slightly increased in depth (2.25 in. min. to 2.40 in. max.), together with a ½-in. mortar joint as a basis of measurement for adjoining units. The slight increase in depth is needed to provide the desirable 1:⅓:½ ratios for brick laid in any position.

These combinations seem to provide the most satisfactory basis for design of adjoining units, with the least disturbance to the manufacturing processes of the majority of industries. This is particularly true with regard to such materials as clay tile and concrete block, whose sizes are now based on standard brick dimensions.

Large Centrifugal Pumps on English Drainage Works

Outfall station has 96-in. oil-engine pumps for high-tide discharge to supplement low-tide gravity sluices with stoney gates—District has 130 miles of main ditches, with some navigation—Land is largely below sea level and still sinking

By E. E. R. Tratman
Wheaton, Ill.

IN THE COURSE of an extended visit to England, E. E. R. Tratman, retired member of the editorial staff of Engineering News-Record, had occasion to study the extensive drainage works of the Middle Level Drainage and Navigation District in the eastern part of that country. For the information of engineers in this country who have similar problems to meet, Mr. Tratman has set forth in this article the significant elements of the English undertaking. The large pumps now employed are especially notable. —EDITOR

OIL-ENGINED 96-in. centrifugal pumps (Fig. 1), stated to be the largest ever built, form an important part of the outfall works of a large drainage district in England, in which much of the drained land lies below sea level. Developments of land drainage in England over a long period of years are illustrated by the extensive old and modern works of this organization, the Middle Level Drainage and Navigation District, in the low-lying marsh or fenlands in the eastern part of the country. The Middle Level District comprises a large area of these lands that have been reclaimed for cultivation by means of levees, drainage ditches and pumping plants since 1663, when grants were made to various persons or associations on condition of undertaking to drain the lands covered by the grants.

The Middle Level District, incorporated in 1810, has an area of about 174,000 acres, consisting principally of fenlands lying several feet below the high-tide levels of the adjacent rivers Nene and Ouse. It is protected against the floodwaters of these rivers by long levees, while provision is made for discharging surplus interior water to a river outfall by a combination of gravity flow and pumping. The main part of the district is shown in Fig. 3. On the north a 12-mile levee extending from Peterborough to Guyhirne protects the area from the River Nene and also from the Nene "washlands" of about 3,500 acres, which are submerged in times of flood and thus serve as a species of detention or balancing reservoir. On the south an 18½-mile levee from Earith to the Welmore Lake outlet sluice excludes floodwaters of the river Ouse and of the Welney "washlands," 4,500 acres, where the flood level is 15 to 20 ft. above the level of the inclosed drained area.

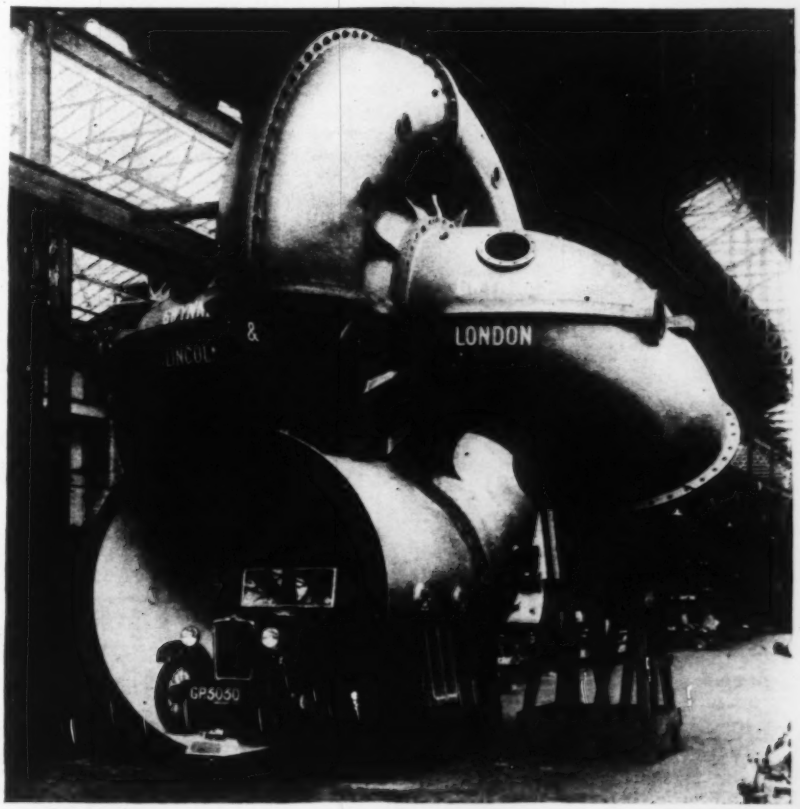
Annual rainfall is about 24 in., with minor floods from November to March. Extreme floods occur about once in four years. The soil includes peat, clay and running silt. Practically the entire area is under cultivation for wheat, barley, oats, sugar beets, potatoes and carrots. Property lines are not marked by hedge fences, such as are common in England, since the ditches and dikes serve as boundaries. The area is divided into 80 fen drainage districts of 500 to 5,000 acres, each under the administration of its own commissioners and having one or more pumping plants to discharge local waters into the main drainage system of the Middle Level District, the latter serving as a high-level canal to convey the waters to the River Ouse and the sea.

Drainage Canals—There are now about 130 miles of river channel and high-level canals within the district, with bottom widths of 20 to 120 ft. Besides these, the inclosed area is intersected by some 250,000 miles of ditches and stream diversions.

Dredging and maintenance work on the waterways are continuous and costly, for unless they are kept in good condition flooding will occur, as the fall in the rivers rarely exceeds 1 in. per mile. There are four floating grab-bucket dredges and three dragline dredges for this work. Weeds are cut twice yearly, in spring and autumn, by the dredges. Navigation, which flourished at one time but dropped to a very low point, has been revived somewhat in the past ten years owing to the growth of the sugar-beet industry. The interests of drainage and navigation are diametrically opposed, especially in winter, since drainage requires practically empty waterways while navigation depends upon plenty of water. However, during or in anticipation of flood periods there are tow barges and crude-oil craft on the canals, but their capacity does not exceed 50 tons. No drawbridges have been built, and the minimum headroom at bridges is 6 ft. above high flood level.

Outfall Works—Under the conditions outlined, it was not easy to provide for removal of the excess interior waters. Until 1850 there was gravity discharge through Tong's Drain (Fig. 3), a canal

FIG. 1—CENTRIFUGAL PUMP with 96-in. runner, two 7-ft. suctions and a 9½-ft. discharge enlarging to 12-ft. bellmouth.



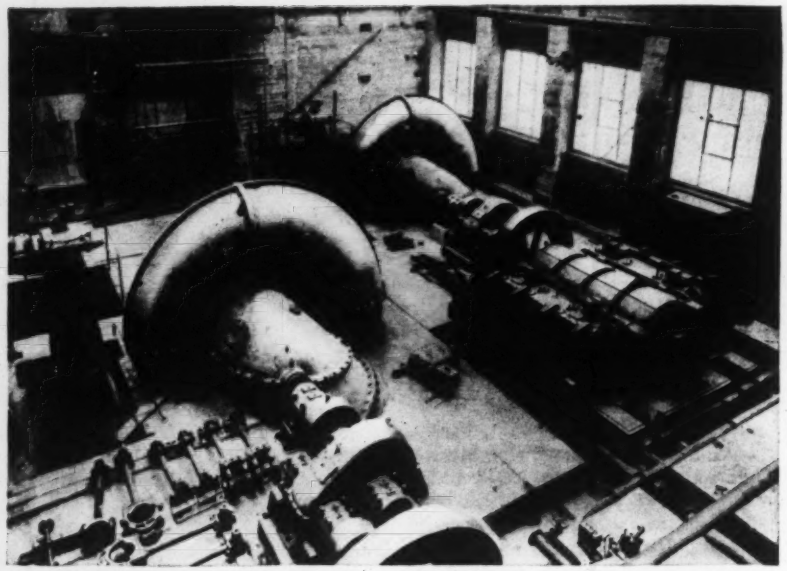


FIG. 2—INTERIOR of north pump-house with two 96-in. pumps. One of the 8-cylinder horizontal oil engines with opposed cylinders is shown at the right.

entering the River Ouse about 2 miles below the Denver sluice, but owing to the continued shrinkage and settlement of the fenlands as drainage progressed this method became less effective. In 1847, therefore, the commissioners cut a new main drainage ditch from the lower end of the Sixteen-foot River to a new outfall sluice at St. Germans, about 6 miles farther down the river, securing a lower level for tidal discharge, but with a shorter discharge period. This ditch or main drain, 12 miles long, has a 48-ft. bottom width and side slopes of 2 to 1.

After this outfall sluice had been breached in 1862 by a high tide, with extensive resultant damage by flooding, it was replaced by a solid dam over which were laid sixteen pipe siphons 36-in. in diameter for removing the drainage water. But the discharge ends of the siphons became silted up, and as this method proved unsatisfactory a new gravity sluice was built on a diversion of the main drain in 1875. With continued sinking of the drained land and silting of the river, the hydraulic gradient was reduced almost to zero during long periods of neap tides. Furthermore, the numerous interior districts often pumped their waters into the main drains at times when the latter were already running full. Peak periods thus became serious, especially when strong winds and high tides restricted the gravity discharge at St. Germans.

To remedy this condition, the commissioners in 1929 decided, on recommendation of the chief engineer, to construct an adequate gravity discharge sluiceway at that point and to supplement it by a pumping station.

Pumps and Gravity Discharge—In early days, or about 200 years ago, the pumping in the fenlands was done by scoop wheels driven by windmills. This system, introduced by a Dutch engineer, was not very reliable, as flood periods often occurred when there was very little wind. Steam engines of the vertical-cylinder walking-beam type, coupled to the scoop wheels, were introduced about 1840. Vertical-shaft centrifugal pumps superseded the scoop wheels, and in turn were replaced by horizontal-shaft centrifugal pumps driven by high-speed steam engines. In recent years crude-oil engines have become popular owing to their economy of operation and to the fact that the local water is unsuitable for high-pressure boilers. At present the cost of electric power from existing transmission lines is prohibitive, owing to the low load-factor. Furthermore, current would be required mainly in the winter, when the generating stations are usually working at maximum capacity.

Owing to the continued settlement of the drained lands the water has to be lifted much higher than formerly. On the average the land surface has sunk 3 ft. in 80 years, and in one exceptional case it has sunk 10½ ft. since 1851. There are places where the land is 5 ft. below sea level and 20 ft. below the top of the levees, and this settlement by shrinkage is still continuing at the approximate rate of ½ in. per year. In several cases the interior water in times of flood has to be pumped twice at different places (and in one case three times), in order to raise it to the required level for discharge. One difficulty is that the land farthest from the outfall is composed of peat and is sinking as the groundwater level is lowered by drainage, while the outfall channel into the River Ouse is silting up and checking the gravity flow. The St. Germans outfall sluice is tide-locked, so that only at low tide can water be discharged by gravity. In winter the water enters the district faster than it can be removed by gravity flow. Hence the necessity of the outfall pumping plant.

St. Germans Outfall and Pumping Station—The new outfall works at St. Germans (Fig. 4) includes two sluiceways for gravity discharge and a three-unit pumping station, the latter being provided to remove excess water when the tide level in the River Ouse is too high to permit of gravity discharge. The two parallel and adjacent sluiceways, each 35 ft. wide, pass through the bulkhead or river wall by openings 35 ft. wide and 20 ft. high. Each opening is fitted with two 30-ton regulating gates of the stoney roller type (Figs. 4 and 5) having a maximum vertical travel of 32 ft. The gates are 60 ft. apart, the

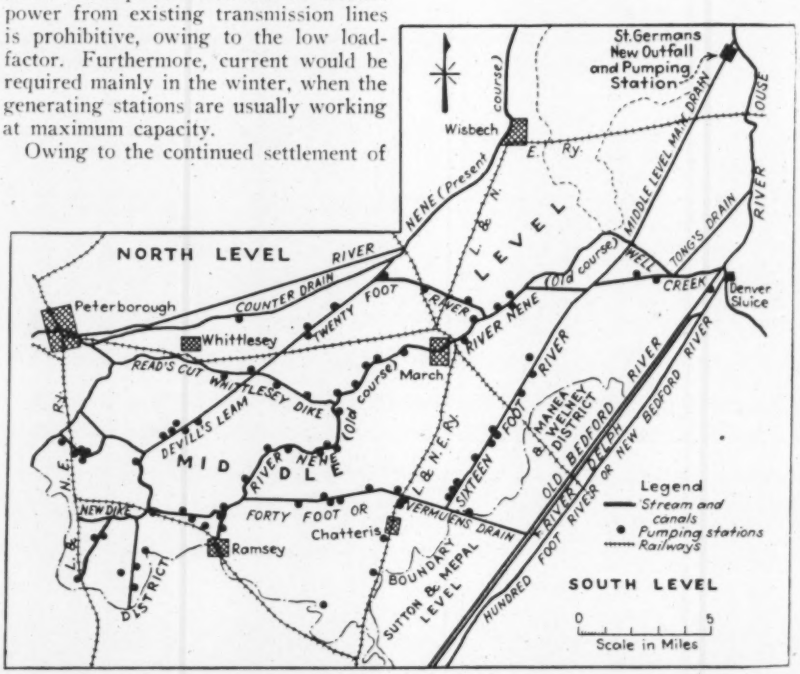


FIG. 3—MAIN DRAINAGE SYSTEM of Middle Level Drainage and Navigation District, in England. Area totals 270 square miles, with 130 miles of main ditches.

inner one being for reserve or emergency use. Their bottom sills are 7 ft. below low-tide level and the lintels about 13 ft. above that level. The gates are designed to be tight against a difference between a 30-ft. head on the river side and 7-ft. on the inner or drain side. They are operated by wire ropes on drums driven by 10-hp. electric motors.

Two one-story pump-houses of reinforced concrete lie on either side of the sluices and are formed integrally with them. Two pumps are installed in the north house, and a third is in the south house, sufficient space being provided in the latter for a future fourth pump.

The site is on the old abandoned main drain where silt had accumulated to a depth of more than 20 ft. since 1880. An area 270x120 ft. was inclosed by 35-ft. interlocking steel sheetpiling driven into the underlying clay, the silt being then excavated. About 1,200 precast concrete piles were driven to 70 ft. below high-tide level. These piles, 14 in. square, are 30 to 45 ft. long; some are driven diagonally to act as braces and also to prevent any lateral motion due to the action of the pumps.

Upon these piles was built a 36-in. slab of reinforced concrete with double reinforcement, forming the base of the sluiceway, bulkhead and buildings. Its surface, which forms the floor of each pump house, is about 5 ft. above the present groundwater level in the district, or 17 ft. below high-tide level in the river. The pump-discharge openings are so arranged as to scour the outfall of any silt accumulation.

Pumping Plant—Each of the present three pumping units consists of a horizontal-shaft centrifugal pump geared to an oil engine of 1,000 hp. and having a discharge capacity of 180,000 Imp. gal. per minute against a static head of 10 ft. The maximum lift will be about 18 ft. The impeller or runner is 96-in. in diameter, with 7-ft. suction pipes on each side. A single 9½-ft. discharge enlarges to a bellmouth of 12-ft. diameter at the outfall connection. (Fig. 1). These are said to be the largest pumps of their types ever made in England, if not in the world. On the delivery side of each pump is a 38-ton 8½-ft. sluicegate that can be operated either electrically or by hand and will be watertight under 25-ft. head in the river. The layout of the north pump-house is shown in Figs 2 and 4.

Three 1,000-hp., eight-cylinder, four-crank, horizontal diesel engines, with opposed cylinders in pairs and working on crude oil, will drive the pumps. Each engine will be connected to its pump shaft through a double helical reduction gear having a ratio of about 2½ to 1, as it is not desirable to operate such large pumps at high speed. Thus the normal engine speed of 225 r.p.m. is reduced to 94.5 r.p.m. on the pump shaft. This speed, in conjunction with the 96-in. impeller, gives the necessary head, which varies of course with tidal conditions but has a maximum of 19 ft. Speed regulation of the engines is provided.

In each pump-house there is an auxiliary crude-oil engine of 40 hp. coupled to a 30-kw. electric generator supplying

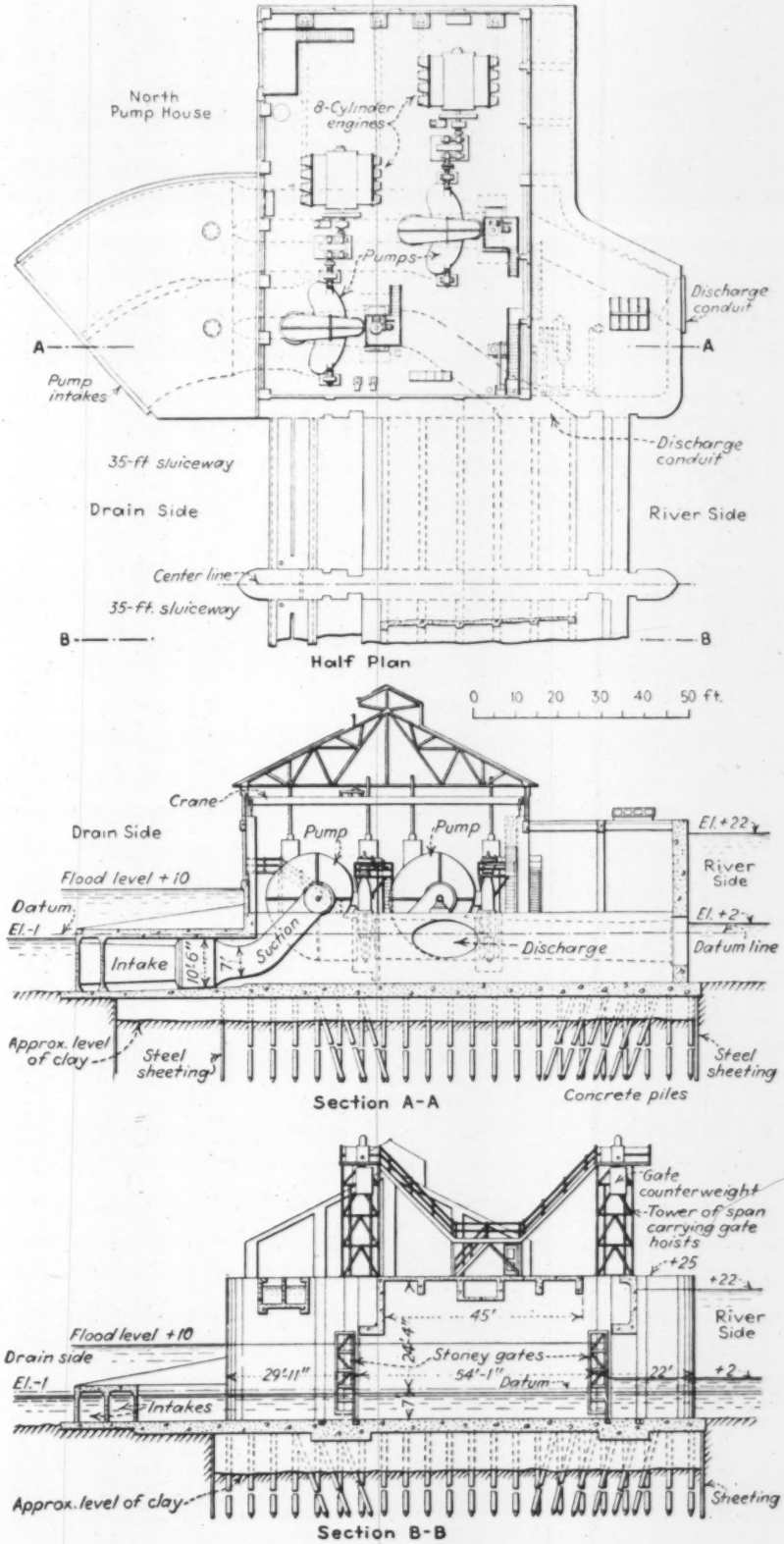


FIG. 4—OUTFALL WORKS at St. Germans include two 35-ft. gravity sluices with stoney gates and two pump-houses with oil-engine centrifugal pumps. Note that pump discharge flushes silt from discharge end of sluiceways.

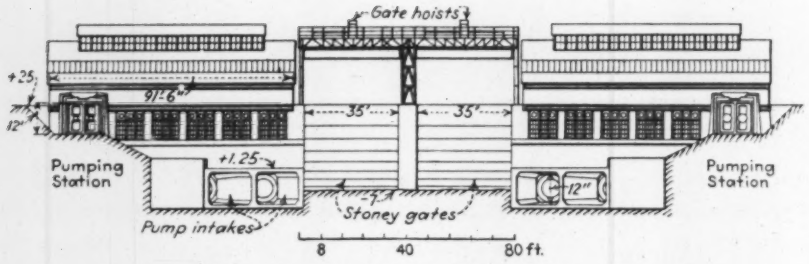


FIG. 5—LAND-SIDE ELEVATION of outfall, showing 7-ft. pump intakes and gravity sluices with stoney gates.

current for lighting and also for the operation of the stoney gates, the sluice-gates, the water-jacket circulating pumps, the starting gear of the main pumps and the oil-fuel pumps. These auxiliary plants are interconnected, and each is of sufficient capacity to serve both pump-houses. The engines were built by the Premier Gas Engine Co., of Sandiacre, Nottingham; the pumps by Gwynnes Pumps, Ltd., of Lincoln and London, and the regulating gates by Ransomes & Rapier, of Ipswich. Storage is provided for 250 tons of crude oil, and each house has a 15-ton overhead traveling crane of 62-ft. span for handling the machinery. Illuminated indicators show continually the tide-water level, the water level in the main drain and the positions of the regulating gates.

Finance and Organization—Until 1930 an annual revenue of about £30,000 ($150,000) for the District was obtained from taxes paid by occupants (or by owners in a few cases). These taxes were based on acreage and degree of benefit, the latter being assessed according to the difference between land level and flood level. The tax ranged from 1s. 4d. (32c.) to 13s. 7d. ($3.40), with an average of 4s. 5d. ($1.10) per acre. The minor or interior districts levied and collected their own taxes, 3s. to 20s. (75c. to $5), or a total of 7s. 5d. to 24s. 5d. ($1.85 to $6.10) per acre. Under the Land Drainage Act of 1930, the acreage tax has been eliminated, and the tax is now based on the annual value of the land and ratable value of the houses, ranging up to 0.10 penny in the pound (or 0.05c. in $5). Land and houses get a rebate of 66 per cent off the ratable value.

For the past twelve years the British government has made grants of 50 per cent of operating and construction expenses, conditioned upon the use of unemployed labor for the construction works. During the same period improvement works have been carried out at an expense of about £600,000 ($3,000,000), half of this being provided by the government. The cost of the new St. Germans outfall works, including the sluiceways, buildings, pumps, engines and regulating gates, is estimated at £225,000 ($1,125,000) in addition to the above expenses. These works will be completed in 1934.

Staff and organization of the District are divided into administration and engineering, the former being concerned mainly with the collection of taxes. All new construction and maintenance works, including bridges, sluices, etc., are designed in the engineering office and are carried out by direct labor. Major Robert G. Clark is chief engineer of the Middle Level Drainage and Navigation District, with David Hill as resident engineer.

Conneaut Harbor Improved to Accommodate Large Modern Ore Boats

Extensions and relocations of breakwaters give wider maneuvering space for 600-ft. ore carriers—New timber crib sunk for lighthouse base—Small rock for jetty handled in LCL containers to site of placement

IN COMMON with some other ports on the south shore of Lake Erie, the protected harbor area at Conneaut, Ohio, is too small to accommodate the large modern ore boats, which are 600 ft. long. In an improvement program, financed from public-works funds, the army engineers are altering the harbor-protection works at these ports. The improvements at Conneaut are typical of the others.

Existing harbor arrangements consist of a long slip or channel at the mouth of the Conneaut River, flanked on the east side by ore and coal-unloading docks and on the west bank by a railroad yard. From the shoreline two timber-crib piers 200 ft. apart carry the channel into the lake for a distance of 550 ft.

The maneuvering area just outside the channel mouth is protected by two long stone breakwaters or jetties. At the outshore end of the west breakwater an arm 980 ft. long is turned almost at right angles toward the east jetty, to protect the harbor from the north, terminating in a lighthouse crib and leaving a 600-ft.-wide entrance between the crib and the opposite breakwater. This arrangement allowed only 2,000 ft. of distance between the harbor entrance and the mouth of the channel, hardly enough space for safe maneuvering of the new 600-ft. boats. To enter the harbor, the boats must come in under steam and then must reverse in order to slow down enough to enter the channel at a safe speed. Equipped with single screws, the boats sheer when the engines are reversed, making control difficult.

To lengthen the harbor, the north arm of the west breakwater, including the lighthouse, is being removed, and the breakwater is being extended northward for 780 ft., where it will terminate in a new lighthouse founded on a rockfilled timber crib. The east breakwater is also being extended northward for 925 ft., terminating in a small light to be erected on the breakwater wall. The two jetties converge to a 600-ft. opening at the outer end. At the channel mouth 428 ft. of the piers jutting into the harbor are being removed and the surrounding area dredged to a depth of 21 ft. These

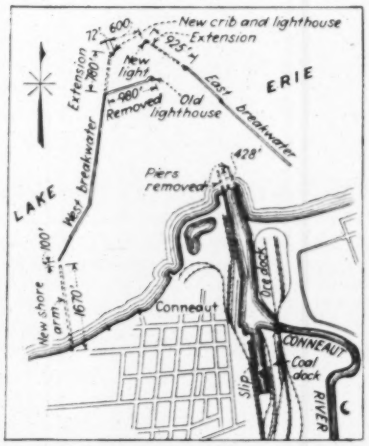


FIG. 1—MAP of harbor improvements at Conneaut, Ohio. Extension of breakwaters was necessary to give modern ore carriers ample room for maneuvering into narrow channel. North arm of old breakwater and lighthouse were removed. Shore arm of west jetty was built to provide greater protection to harbor.

changes add over 1,000 ft. to the length of the outer harbor. They are all under a single contract, except for the erection of the lighthouse superstructure.

At the west side of the harbor a gap of 1,800 ft. of shallow water existed between the south end of the west breakwater and the shore. Storm waves frequently swept through this gap, creating a hazard to shipping within the harbor. Consequently, under another contract, a shore arm of the west breakwater has been extended lakeward for a distance of 1,670 ft. from land, leaving a 100-ft. opening between the ends of the old and new jetties for passage of small boats.

These improvements will give Conneaut one of the finest harbors on the lake. As the nearest lake port to the Pittsburgh and Youngstown steel districts, an average of 10,000,000 tons of ore and coal has been handled annually for the past ten years. Shipping tonnage through Conneaut nearly equals that of Cleveland.

Timber crib for lighthouse

The first construction operation was the building and sinking of a 50x50-ft. timber crib, 28 ft. high, for the base of the new lighthouse at the north end of the west breakwater. It consists of four solid timber walls of 12x12-in. timbers,

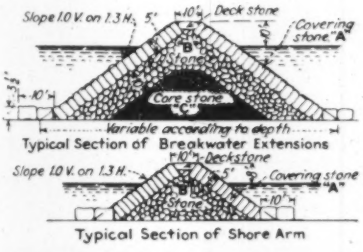


FIG. 2—TYPICAL SECTIONS of main breakwater extensions and the new shore arm. Core stone in shore arm was placed by dumping LCL containers, loaded at the quarry, directly into place.

with 9-in. solid timber cross-walls dividing the interior into 25 square compartments. All timbers are fastened together with long drift bolts, and the whole is tied with iron tierods. The bottom, resting on a prepared base of small stone, consists of a timber grillage tied to the walls. All posts in the crib are 12x12-in. timbers. Two pockets in each corner were planked and calked at the bottom, forming watertight wells to provide the buoyancy, where necessary, for floating to place.

The crib was built near the mouth of the river, floated to the site and sunk by superimposing weights of 5-ton concrete blocks. When the crib was settled in position, it was filled with small stone from a self-unloading stone carrier (Fig. 3) and was trimmed off with stone placed by a derrick boat equipped with a clamshell. The fill, of stones weighing 10 to 100 lb., was leveled off in the outside pockets 3 ft. below the top of the

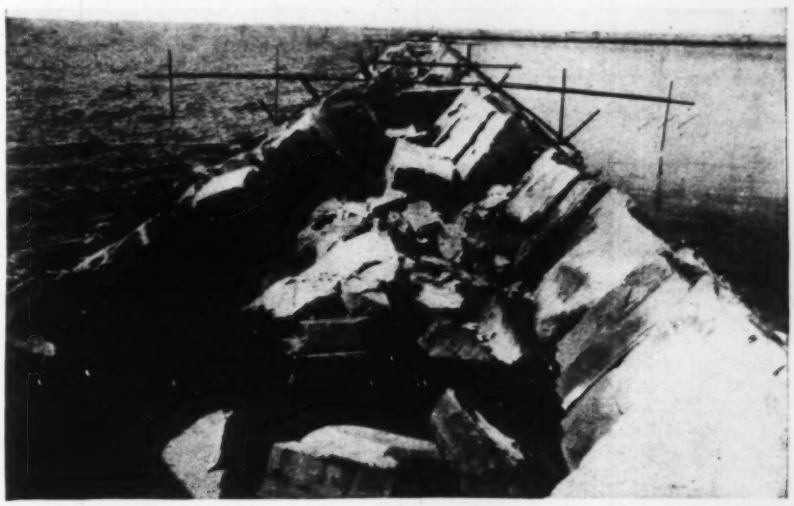
FIG. 3—TIMBER CRIB for new lighthouse foundation, part of Conneaut, Ohio, harbor improvements. Stones weighing 7 to 10 tons each, placed by this derrick boat, forced the crib down to a prepared bottom. Interior pockets were filled with small stone from a self-unloading ore carrier, whose boom is shown at right.

crib, and on the inner pocket 1 ft. below the top of the timber. On top was placed a layer of small stone, to smooth up the surface. Over this layer was spread a cover of 12-oz. canvas.

The reinforced-concrete base slab for the lighthouse extends 10 ft. above the top of the crib, built up in blocks corresponding to pockets of the cribs, the blocks being poured alternately. Surmounting the base is a concrete pedestal $24\frac{1}{2}$x$26\frac{1}{4}$ ft., which will carry the lighthouse superstructure. Concrete for the base was prepared in a mixer boat and handled to place in buckets by derrick boat.

In the removal of the north arm of the west breakwater, much of the stone is being salvaged for use in the extension to the new crib. The heavy cap and face stones are removed piece by piece, while the small core stone is recovered with a clamshell loading into dump scows. The design of the outer extensions of both breakwaters is shown in Fig. 2. Interior core stone is placed by dumping from dump scows. This stone is specified to contain not less than 35 per cent of pieces weighing 75 lb. or more, with not more than 3 per cent weighing less than 1 lb. Outside this inner core is placed a 10-ft. blanket of coarse stone, specified 150-lb. minimum weight for individual pieces. The outer core is then

FIG. 4—SHORE ARM during construction. Huge cover stones on sides were placed to remarkably true slopes by derrick boat.



faced with a 5-ft. minimum thickness of stones weighing not less than 3 tons, with at least 50 per cent weighing 5 tons or more, placed individually by derrick boats to a slope of 1 on 1.3. Capping the breakwater is a single layer of 5-ton deck stones placed to form a flat top 10 ft. wide. At each toe of the stone fill are placed two rows of 7-ton minimum weight blocks to form a footing at least 3½ ft. thick and 10 ft. wide. The breakwater extensions are built to a height of 10 ft. above low-water datum.

LCL containers handle small stone

In the construction of the shore arm of the west breakwater an interesting method of handling the small core stone is employed. This section, in shallow water, requires only one size of core stone, minimum weight 150 lb. This stone is loaded at the quarry at Amherst, Ohio, 110 miles away, in LCL container units built for brick handling. Each container holds 5 tons of rock. Twelve containers make a carload. The cars are delivered alongside the west river bank, where derricks transfer the containers to a derrick boat. Usually 48 boxes are handled in one boat load.

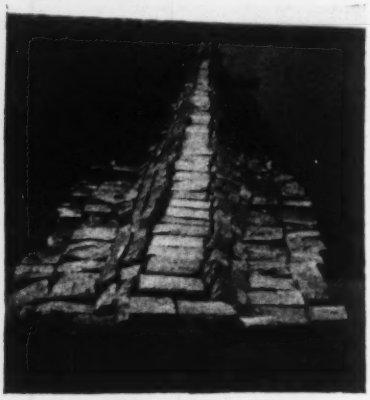


FIG. 5—COMPLETED shore arm, showing how section was carried well into land. Side and deck coverings of 5-ton stones and 7-ton toe blocks are required to resist the fury of Lake Erie's storms.

The loaded boat is towed to the breakwater site. One by one the containers are hoisted over the side, let down to bottom, and then the bottom doors are tripped. This method of placing, now becoming common in the lake area, permits very accurate placement of the stone. Cover, footing and deck stones, of the same size as for the outer extension, are placed individually. The top of the breakwater for this section is 8 ft. above water level. This arm of the jetty ties into land. The contractor built the stretch near shore from the land side, using tractors and crawler cranes.

All river and harbor work on the Great Lakes is under the supervision of the Corps of Engineers of the War Department, division headquarters being at Cleveland, Ohio. The work at Conneaut is under the Buffalo, N. Y., district. Lieut-Col. M. C. Tyler, Corps of Engineers, is division engineer; Lieut. T. H. Stanley, district engineer for the past year, has been recently relieved by Lieut.-Col. J. A. O'Connor. John F. Nash is senior engineer of the Buffalo district, and Stuart Moore is engineer in charge at the site. Contract for the construction of the west breakwater shore arm is held by the L. A. Wells Construction Co., Cleveland. All other work is being done by the Great Lakes Dredge & Dock Co., Buffalo office. R. J. Walsh is superintendent in charge.

Sewage-Plant Survey—VII

Data from Urbana and Champaign, Ill.

THE FOLLOWING ARTICLE is the seventh of a series presenting in brief form the salient design and performance characteristics of American sewage plants. Articles already published have presented data from the following cities: Decatur, Ill., March 29, p. 409; Cleveland, Ohio, April 12, p. 480; Schenectady, N. Y., April 26, p. 527; Aurora, Ill., May 10, p. 596; Lima, Ohio, June 21, p. 813; and Grand Rapids, Mich., July 12, p. 50.

DURING the year ending April 30, 1933, the sewage-treatment plant of the Urbana and Champaign Sanitary District reduced by 84 per cent the polluting qualities of the district's sewage before discharging it into the West Fork of the Salt Fork River. Detailed design and operating data for the year ending April 30, 1933, are tabulated below.

Treatment units employed include coarse screens, Imhoff tanks, trickling filters and a secondary sedimentation tank. Sewage is conveyed to the plant through a separate system of sewers. The plant was designed in 1923 by Pearse, Greeley and Hansen to care for a population of 45,000. Operation was begun on Nov. 21, 1924. A secondary sedimentation tank was added in 1929. To date, the total cost of the plant is reckoned to be $600,139.

Salt Fork has a drainage area above Urbana of 76 square miles. It is a tributary of the big Vermilion River. The normal flow of the stream is only about 3 m.g.d.

Humus removed from the secondary sedimentation tank is pumped to the influent channel of the Imhoff tanks. About 2,000 gal. of this humus is removed per million gallons of trickling-filter effluent.

An interesting feature of the plant is a large lagoon which receives the effluent from the secondary tanks during the summer. This lagoon is stocked with fish which thrive in their environment. Their presence makes a favorable impression on visitors.

The design and operating data in the accompanying table were furnished by G. H. Radebaugh, district manager. The flow figures cited were determined by weir measurement. Analytical results are based on composite samples.

SEWAGE-PLANT PERFORMANCE DATA, URBANA AND CHAMPAIGN, ILL.

GENERAL DATA

Population, 1933	43,912
Population served, 1933	39,000
Rated capacity of plant, m.g.d. max	6.75
Sewage flow	
Average m.g.d.	3.5
Maximum day, m.g.d.	4.7

SEWAGE-TREATMENT UNITS

Coarse Screens	
Number of units	1
Width of opening, in.	1 5/16
Submerged area of screen, vertical projection, sq.ft.	40.5
Angle of screen with horizontal, deg.	45
Method of cleaning	manual
Imhoff Tanks	
Number of units	4
Plan dimensions, each unit, ft.	75x28
Settling compartment	
Surface area, each unit, sq.ft.	1368
Depth to slot, ft.	12½
Area of cross-section, sq.ft.	116
Sludge compartment, total, cu ft.	148,500
Gas-vent area, each unit, sq. ft.	740
Sewage flow, all units, m.g.d.	3.5
Detention period, all units (actual flow), hours	1.8
Frequency of sludge removal, each unit, times per year	8
Trickling Filters	
Number of units	2
Total area, both units, acres	8
Sewage flow, all units, m.g.d. (See *Note A*)	1.7
Type of filter material	crushed limestone
Depth of filter material, ft.	10
Type of distributing system	spray nozzle
Type of underdrain system	ridge and furrow
Secondary Sedimentation Tank	
Number of units	1
Plan dimensions, each unit, ft.	50x50
Operating depth, including sludge space, ft.	7½
Depth allotted to sludge space, ft.	2
Provisions for sludge removal	Rotating scrapers
Sewage, flow, all units, m.g.d. (See *Note A*)	1.7
Detention period at actual flow, all units, hr.	1.2

Note A: During the months May to November, flow to trickling filters and secondary tank ranged from 77 to 96 per cent of Imhoff tank effluent. From December to April this percentage ranged from 57 in December to 12.5 in March.

SLUDGE DISPOSAL

Sludge-Drying Beds	
Number of units	12
Plan dimensions, each unit, ft.	100x25
Depth of sand, in.	12 to 24
Depth of sludge applied, in.	10

ANALYTICAL RESULTS

	Settleable Solids, c.c. per liter	Suspended Solids, p.p.m.	Five-Day B.O.D. p.p.m.
Raw sewage	9	215	179
Imhoff-tank effluent	T	88	126
Trickling-filter effluent	T	53	32
Secondary settling-tank effluent	T	37	24

SCREENINGS, GRIT AND SLUDGE

	Volume, Cu.Ft. Per M.G.	Dry Solids Per Cent	Volatile Solids per Cent	pH	Disposal
Coarse screenings	0.9	15	85	...	Limed and buried
Imhoff-tank sludge	32	10	...	6.9	To drying beds

Largest British Dam Completed in India

Mettur dam containing 2,000,000 cu.yd. of masonry and concrete, 230 ft. high and 5,000 ft. long, is completed on Cauvery River after six-year construction period—Reservoir of 2,140,000-acre-ft. capacity will be used for rice irrigation and flood control

THE METTUR DAM—the largest in the British Empire—has been completed in southern India to provide 2,140,000 acre-ft. of storage for irrigation and flood control, with supplemental power development. The main features of the structure on the Cauvery River are: maximum height 230 ft. above foundation, crest length 5,000 ft., volume of masonry and concrete totaling 2,000,000 cu.yd. The control over the flow of the river, effected by the storage behind the dam, will provide an assured irrigation supply to about 1,000,000 acres of existing rice fields and, in addition, make possible the development of 300,000 acres of new irrigable land. The project has been carried out by the Madras public-works department, and the principal features of the development are outlined briefly in the following. The material was abstracted partly from *Engineering*, London, and supplemented by direct correspondence.

The Cauvery River, about 500 miles long, situated in the southern end of the Indian peninsula, rises in a watershed area that extends to elevations of about 5,000 ft. These headwater areas receive an average annual rainfall of about 200 in., with a maximum of double this figure. In the lower sections of the stream, however, the valley region has an average rainfall of about 35 in., with a possible minimum of only 20 in. The lower part of the valley and the delta area of the river are extensively developed in rice cultivation, and irrigation is essential.

The uncontrolled flow of the river in the past has rendered this valuable agricultural area subject alternately to disastrous floods or deficiency in irrigation supply. This situation led to the development of this water-conservation and storage program. In addition to the dam, the development includes an extensive canal system that is not covered by this review.

Although the project was under consideration for many years, the necessary governmental agreements required for the storage on the river were not completed until 1926. Preliminary work at the dam site started the same year. Actual construction on the dam began in 1928.

Located more than a score of miles from transportation facilities, a road was first constructed to the site, and later a branch railroad 37 miles long was built. A transmission line to provide construction power was built from existing government power supplies for a distance of 62 miles across jungle country infested with wild elephants.

The drainage area behind the dam is 2,300 square miles, and the unusual run-off characteristics can be appreciated from the fact that in July, 1924, the then-recorded maximum flow of 250,000 sec.-ft. was exceeded by a flood of 436,000 sec.-ft., or an increase of 74 per cent in recorded flood peak. This new flood record was used in the design of the spillway works.

FIG. 1—THE LARGEST DAM in the British Empire, this structure in southern India stores 2,140,000 acre-ft. on the Cauvery River for irrigation and flood control, with supplemental power development.

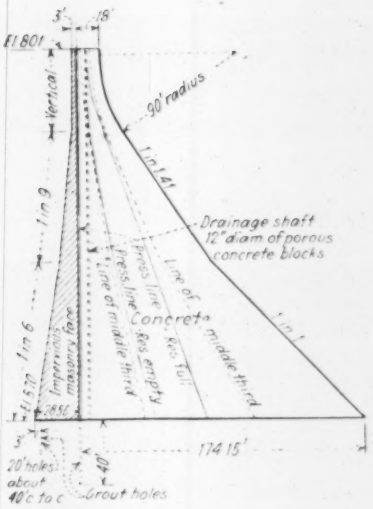
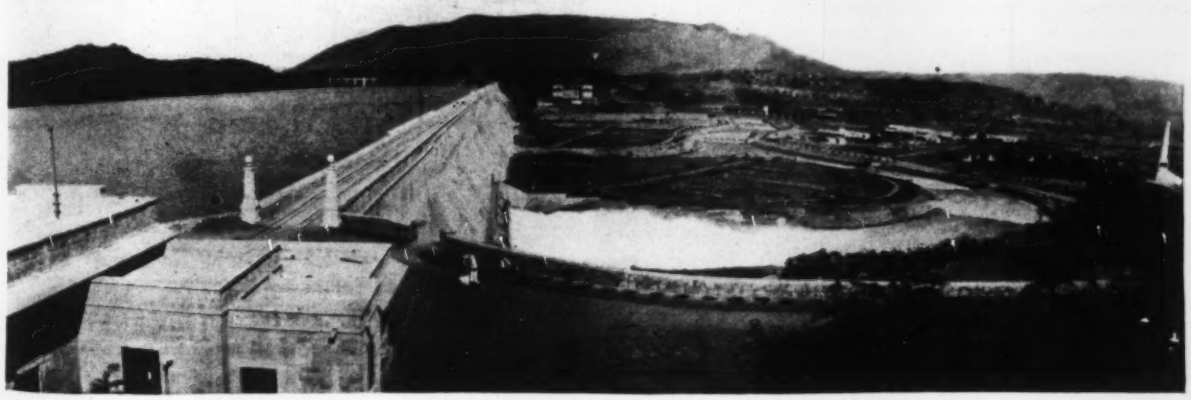


FIG. 2—MAXIMUM cross-section, showing area of impervious masonry facing and concrete in body of dam.

Dam design

The structure has a gravity section with a straight crest and a profile as indicated in Fig. 2. The upstream face, 3 ft. thick at the crest and 28 ft. thick at the base, is of rubble masonry set in special rich mortar. This mortar consists of cementing material composed of 80 per cent cement and 20 per cent pulverized underburned brick mixed with $2\frac{1}{4}$ parts sand. The burned brick was added to the cement as an economy move, costing only one-ninth as much as cement; it also was claimed to produce a more impervious mortar.

Behind this masonry face the main body of the structure is built of concrete. However, in some sections where concrete-placing equipment could not reach, the rubble masonry construction was extended to form the full section. On one side of the valley where the structure extends for a long distance as a wing wall, the masonry construction was used entirely, proving more eco-



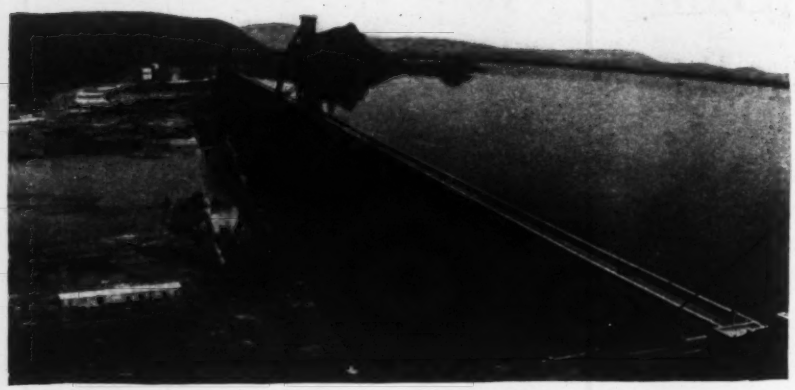


FIG. 3—CONCRETING TOWERS, running on tracks along the downstream toe, were 306 ft. high and contained aggregate bins, mixers, hoists and chuting system.

nomical than if tracks for the concreting towers had been provided.

Grout holes 20 ft. deep on 40-ft. centers are provided along the upstream face, and a secondary line of holes 40 ft. deep was drilled along the back edge of the impervious masonry face, with the usual system of drains extending into drainage galleries and shafts.

Construction joint design differed considerably from American practice. Joints were left at 126-ft. intervals along the length of the dam extending from upstream to downstream face. Immediately back of the impervious masonry section, triangular recesses were left on each side of the construction joint to provide a vertical hole 1 ft. square with its diagonal along the line of the joint. Into this vertical space a spirally reinforced square concrete "staunching post" was placed with its surfaces covered with a bituminous compound. According to the design principle of this feature, water pressure from the upstream face will press this concrete column against the back of the joint with a wedge action that is intended to stop leakage.

As a further precaution against seepage along the construction joint beyond this point, a U-shaped copper waterstop of usual design was provided. The line of drains and the drainage gallery are located immediately behind this shield so that the provisions against water under pressure reaching the concrete in the main body of the dam are unusually thorough.

Construction operations

Foundation work was not unusual, as the wide stream valley allowed the river to be turned from one side to the other, which permitted unwatering of coffer-dammed areas.

The outstanding features of construction operations were the two 306-ft. concreting towers, each weighing 1,300 tons empty or 1,800 tons with aggregate bins filled. These electrically operated units were each designed to mix 150 tons of concrete per hour and could deliver it to the full height of the structure. Operating under their own power, they moved at a speed of 12 ft. per minute running on three sets of 2-ft.-gage track constructed on a specially built causeway at the downstream toe of the dam. Power for traveling is supplied in three 65-hp. motors operated through a master controller, and magnetic brakes are provided.

Concreting material was delivered on the tracks to the towers and lifted into bins that discharged into batching equipment, delivering into 2-yd. mixers. From the mixers hoists raised the concrete to discharge into chutes that extended over the width of the dam.

According to the construction program, the front impervious masonry section was carried up simultaneously as the concreting advanced. The concrete mixing in the towers was interrupted occasionally to mix batches of mortar for the masonry work.

An extensive crusher plant was installed at the project to produce coarse aggregate. Sand was delivered by industrial railroad from deposits in the river channel as far as 9 miles from the site. Spillway provisions were comparatively easy because of existing saddles in the hills near the dam site. One of these openings was equipped to provide for the maximum flood of record, and the other gives additional emergency spillway capacity.

The development was carried out by the Madras public-works department. The successive chief engineers in charge of construction were R. F. Stoney, C. T. Mullings, F. M. Dowley (for a short period), Vincent Hart and C. Gordon Barber. The originator of the project was Colonel W. M. Ellis. Stoelhert and Pitt, Ltd., Bath, England, built the concreting towers.

Long Beach School Reconstruction Program

AFTER the earthquake early last year the city of Long Beach, Calif., had on its hands 35 to 40 seriously damaged school plants, many requiring to be completely reconstructed. Progress to date on this problem includes the completion of a program for reconstruction of permanent school structures, and much of the work is now well under way. A review of the situation in Long Beach as of May 1, 1934, follows.

Practically all of the damaged school plants have plans for repair or reconstruction nearly completed, several which have been completed already are approved by the state board of architecture, and others are being checked. Working drawings were completed for work to be done on about one-fourth of the program, most of which involved entirely new construction, using only the foundations of the buildings in service before the earthquake.

For purposes of estimate and financial allotment the schools were divided into three classes—namely, junior colleges, high schools and elementary schools. The estimated total amount of expenditure required in these three grades was about $6,250,000. The total value of salvage in school plant structures that came through the quake amounted to only $382,000, making the total value of the school plants after reconstruction $6,665,000. This total, if funds are secured as planned, will come from the sources indicated in the table below.

To obtain the funds necessary for this reconstruction, the Long Beach school districts sold to the Unified Rehabilitation Corp. bonds in amount of $1,340,000 at 4¼ per cent interest, and to Los Angeles and Long Beach banks bonds in the amount of $200,000 at 5 per cent interest. They have likewise obtained from the PWA loans and grants in the amount of $927,000, these loans and grants being supported by bonds of the district. In short, the district on May 1 had available $2,467,000 for construction purposes. Further negotiations on federal allotments were still pending.

SOURCES OF FUNDS FOR RECONSTRUCTION PROGRAM

Classification	Federal Grant (Application)	Federal Loan (Application)	District to Furnish	Totals
Junior college	$51,000	.....	$149,000	$200,000
High Schools	548,332	$626,000	1,023,000	2,197,417
Elem. schools	967,586	2,627,000	245,916	3,885,500
Totals	$1,556,918	$3,298,000	$1,418,000	$6,282,917

Public-Works Program Dominates N.E.W.W.A. Meeting

Shortcomings of the PWA program given detailed consideration and many recommendations made for their remedy —Technical subjects discussed include taste and odor control, pipe-line corrosion and distribution problems

ECONOMIC and engineering aspects of the public-works program under the National Industrial Recovery Act occupied a prominent place in the program of the New England Water Works Association, meeting in annual convention in Boston, Mass., Sept. 18-21. That the public-works program has not been proceeding with perfect smoothness was made evident in the discussion, but all those who recounted their own experiences were able to recommend modifications that they felt would improve the program's functioning.

The general problem of planning for public works, fundamental to any coordinated construction program, was discussed by Victor M. Cutter, chairman of the New England Regional Planning Commission. Mr. Cutter stated that projects for improvements that are interstate in character are properly the field for regional planning. The New England Regional Plan Commission has set for itself a number of immediate objectives, which include the setting up of a ten-year program of public works, a study of land uses, a program of legislation that will facilitate the rational development of the natural resources of the region, and studies of transportation and its problems.

Discussion of the public-works program proper was opened by Willard T. Chevalier, vice-president, McGraw-Hill Publishing Co., who presented an analysis of the operation to date of the PWA program. Colonel Chevalier introduced his remarks by stating that there was an unfortunate popular confusion in regard to the public-works program. In the public mind the three functions of relief, recovery and reform are confused, he said. Unfortunately this confusion has affected the administration of the program itself, which, while properly a recovery measure, has been made to function as though it were also for relief and recovery.

Colonel Chevalier then proceeded to differentiate between the cost of public works as an economic enterprise and the cost of pure government. The latter, he said, is the cost of community overhead and should properly be kept at a minimum. Capital improvements, on the other hand, are of an essentially different nature in that they add to the wealth of the community. There is a vast opportunity, he stated, to reduce community overhead costs by taking proper advantage of the capital improvement already in existence.

In analyzing the operations of the PWA program, Colonel Chevalier pointed out a number of shortcomings and made a diagnosis of their causes. Among the conditions handicapping the success of the program have been the early necessity for improvization, both in regard to organization and the public-works projects themselves, the confusion of purpose in regard to relief and recovery, the competition for projects between the PWA and the CWA, unwise restriction on PWA operations in regard to labor and equipment, too great expectations as to the possible achievements of the program, and too great obstruction by business leaders and government officials unsympathetic toward it as a means of economic recovery.

A less sympathetic attitude for the use of public-works construction for economic stabilization was taken by R. F. Meriam, professor of business economics, Harvard University, who followed Colonel Chevalier on the platform. Professor Meriam approached the subject from the standpoint of an economist examining the ability of such a program to stimulate recovery—that is, to create a multiple in business turnover.

The first question involved, Professor Meriam stated, is the proper time for the inauguration of such a program. At one time it was believed that it was proper to inaugurate the program at the start of a depression, but this belief has been shown to be incorrect by the experiences in 1929 when the railroads and public utilities greatly increased their rates of capital expenditure without material success in preventing the progress of deflation. The correct time to put such a program into effect, the speaker stated, is rather at the end of a depression. At that time most of the purging effects of deflation have been achieved, and economic conditions are ripe for recovery. The stimulus to be provided by enlarged governmental expenditures for capital improvement is then more likely to hasten the recovery process.

Of equal importance is the determination of the proper amount of expenditure. An amount that is too small will be ineffectual, while a program that involves too great an expenditure of funds is likely to prove a depressant.

In addition, the expenditures must be made on the right terms, Professor Meriam said. In this regard, danger is presented by wage rates that are too high. Further, to be successful, such a program must be predicated upon a moderate rate of governmental expenditure prior to the onset of the depression.

The speaker stated that, in his judgment, it was unlikely that these requirements could ever be met under a democratic system of government. It is more likely that the pressure of public opinion would always be too great to allow a program to be administered in the only ways possible for it to achieve success.

Engineers' experiences with PWA

On the morning following the debate between Colonel Chevalier and Professor Meriam an active discussion was held by a group of engineers on the experiences they had had in connection with the public-works program. The discussion was begun by Harold J. Lockwood, state engineer (PWA) for New Hampshire, Vermont and Maine. When the PWA program was inaugurated, Mr. Lockwood reported, there was a great amount of confusion on the proper procedure in regard to loans and loan applications. In addition to the functional ailments of the PWA organization, many states were in financial difficulties or legally handicapped from taking advantage of the loan provisions.

Mr. Lockwood recommended that in the future projects should be classified in accordance with the amount of expenditure involved. Further, he recommended more decentralization of organization, the setting of rates of pay to conform to local labor conditions, and the granting of more consideration to local contractors.

He was followed on the platform by A. L. Shaw, consulting engineer, Boston, Mass. Mr. Shaw in his discussion emphasized the difficulties experienced by the contractor on PWA jobs. The most serious difficulty arose from the contractor's loss of control of labor supply through the operation of the public-works law. The requirement that labor be supplied by the state employment agencies handicapped greatly the contractor in organizing his job quickly and to the best advantage.

T. B. Parker, state engineer (PWA), Massachusetts, stated that among the conditions making for delay has been the formal requirement of the federal authorities in connection with changes in plans after work is under way. He also observed that construction work done by force account had in general

proved unsatisfactory, and recommended that it be held to a minimum. Another troublesome factor has been the intermediate wage rates to be paid. Mr. Parker reported that a new schedule for wage rates had been promulgated in Massachusetts, to apply to those classes of workmen between the grades of common and skilled labor.

Sanitary improvements made active by the federal public-works program in the state of Connecticut were reported on by W. J. Scott. The largest project in this class, the water-supply improvement for the Hartford metropolitan district, estimated to cost $8,500,000, has been withdrawn from the PWA list in favor of private financing. In general, sewerage works have been more active than waterworks improvements.

Experiences with the PWA and CWA program in New York State were described by Earl Devendorf, associate director of the division of sanitation, New York State department of health. Mr. Devendorf reported that up to July, 1934, the sum of $27,032,000 had been expended for relief purposes in that state.

Taste and odor problems

The vexing problem of avoiding unpleasant tastes and odors in finished water was a subject of lively discussion at the first session of the convention devoted to purely technical subjects. James M. Caird, Troy, N. Y., emphasized the value of determining the intensity and classifying various odors. He stated that it has been demonstrated that the stripping of a reservoir site before allowing it to be filled with water does not prevent the growth and development of algæ and resultant unpleasant odors in the water. It is unwise, he said, to allow frequent reservoir overflows by way of the spillway, as the wasting of pump water is undesirable. He recommended instead that water should be wasted from the bottom of a reservoir so that the better water at the pumps might be conserved.

George B. Houser, Boston, Mass., described the experiences at Rockport, Mass., in combating the growth of algæ in its pond supply. Rockport uses copper sulphate annually to kill the organisms, applied at the rate of about 6 lb. per million gallons. The effect of the chemical on the organisms is not immediate but is delayed about ten days. This treatment has resulted in reductions as high as 96 per cent, although on several occasions the algæ were found to have increased rather than decreased subsequent to the copper sulphate treatment.

The latest form of osmoscope, a device for determining the intensity of odor in water, was described by Gordon M. Fair, Harvard University. The device consists of a tube provided with two nostril pieces. A series of holes in the tube and the surrounding sleeve can be adjusted to allow the dilution of the odor with air, through a wide range of dilution.

Porous-plate filter bottom

Experimental study of porous plates for use in filter bottoms was described by T. R. Camp, Massachusetts Institute of Technology. Professor Camp's test set-up is in the Providence, R. I., filter plant and consists of an experimental filter unit in which the sand is supported by a porous plate similar to the plates used in a sewage aeration tank. Beneath the plate there is an open space available for the filtered water. It has been found that the plate slowly becomes clogged by the microscopic matter that passes the sand bed, and attention is now being given to devising economical methods of cleaning the plate. The advantage of such a system, Professor Camp declared, is that it makes possible a uniform distribution of washwater.

Tuberculation of pipe lines

The formation of tubercules or nodules on the interior of iron pipe and the hydraulic consequences of this tuberculation were discussed by Robert Horton, Voorheesville, N. Y. Mr. Horton listed three types of action that take place within the interior of an iron pipe during its service that tend to decrease its capacity. These are sedimentation, chemical precipitation and tuberculation proper. The first two types of action have a tendency to proceed until the interior of the pipe is completely closed. True tuberculation, however, which is the development of nodules of iron oxide on the pipe surface, proceeds in a different manner and does not approach the condition of complete clogging of the pipe bore. Mr. Horton advanced the view that the tubercules are due to the action of iron-fixing bacteria, and that the iron deposited on the pipe surface comes from the water being carried rather than from the pipe material itself.

This last view was disputed in the discussion that followed the presentation of Mr. Horton's paper. The opposing view was advanced that tuberculation was electro-chemical in its origin rather than bacterial, and that the iron oxide of which the tubercules are formed is the result of action on the pipe material.

The relation between the pipe-line capacity and length of service was the subject of a report of the association's committee on pipe-line coefficients, presented by Elson T. Killam, New York. This committee has received reports from a number of cities in regard to pipe lines and has found coefficients for the Hazen-Williams formula varying from 20 to 145. In general, it appears that the values recommended by Hazen and Williams after various service periods are not borne out in practice, a reduction in value to 87 being found within thirteen years instead of the predicted thirty.

In the discussion that followed, a widespread belief was apparent that changes in the rates of capacity reduction were due to a change in the quality of the tar coating used in the manufacture of cast-iron pipe, and also to the changes in the character of the water carried resulting from the introduction of water-purification plants. The view was also expressed that the rate of capacity reduction in the distribution system is quite different from that observed in main feeder lines carrying water at a relatively constant rate.

Progress on Boston water supply

The present status of the extensions to the Boston metropolitan district water supply was described by Frank E. Winsor, chief engineer. Mr. Winsor recounted the history of the metropolitan district construction commission and declared that the improvement program now under construction is the first major extension to Boston's supply for 30 years. This extension, involving the development of the Ware and Swift rivers, will involve an expenditure of about $50,000,000. The main features of the extension are a reservoir on the Swift River, called the Quabbin Reservoir, and a tunnel from this reservoir to the existing Wachuset Reservoir. Construction of the tunnel was begun in 1931, and is now nearly completed. It will be ready for use next year.

Distribution-system problems

The practice in the Boston water supply department as to the spacing of gates and hydrants was discussed by Thomas E. Lally. At present, hydrants are spaced no more than 250 ft. apart in the congested districts and no more than 300 ft. apart in the residential district. The present practice is to place the hydrants exactly on the lot line to avoid difficulties in connection with the possible construction of automobile driveways.

F. Wellington Gilcreas, Albany, N. Y., discussed the materials used for service pipe and the attendant corrosion problems. He stated that, because of the relatively stagnant condition of the water in the service pipe, the pipe material is especially subject to corrosive action. Lead is susceptible to corrosion with a soft water. Galvanized iron is also attacked by soft water, the zinc lining being affected similarly to lead. Brass pipe, he felt, is most suitable in many ways, although water of low oxygen content, low pH and high carbon dioxide content, will cause corrosion. He stated that special brasses are even more satisfactory. Copper will be subject to corrosion when the pH is low, but not when it is high. Cement-lined pipe may be subject to impairment through the solution of the lime in the cement by soft water. The simplest means of avoiding corrosion, he stated, is the use of a lime dose in the water, but it has the disadvantage of increasing the water hardness.

Book Reviews and Notes

A monthly Commentary on Current Additions to the Civil Engineer's Library

Transport Abstractly Considered

RAILWAYS AND ROADS IN PIONEER DEVELOPMENT OVERSEAS—By J. Edwin Holmstrom. Cloth; 6x9 in.; pp. 304; tables and diagrams. Published by P. S. King & Son, Ltd., London. 15s.

FACTORS that should be considered in attempting to determine whether to use rail or road transport in opening of new country are discussed in this thesis of an engineer experienced in the construction of railway lines in virgin territory. All factors affecting both railway and highway transport are fully discussed, and costs of recently constructed highways and railways in the British colonies are used to obtain comparable figures for the *value* of each type of service. The author points out that the factors affecting each case are so variable as to require each to be separately considered, but in the abstract his figures indicate that the critical point at which road cost rise above rail costs is in the neighborhood of 17,000 equivalent ton-miles per route-mile per annum. Improvement in motor vehicles and reductions in the cost of motor fuels may increase this figure but they cannot be expected to raise it beyond 50,000 ton-miles, the author states. The cost figures given in the book will be of value to those concerned with railway construction in the countries covered.

Surveying

ENGINEERING SURVEYS—By Harry Rubey. Flexible; 5x8 in.; pp. 430; photographs, diagrams and tables. Published by The Macmillan Co., New York. $3.

SURVEYING: VOLUME II, HIGHER SURVEYING—Charles B. Breed and George L. Hosmer. Fourth Edition. Fabricoid; 5x7 in.; pp. 597; maps, tables and photographs. John Wiley & Sons, Inc., New York. $3,50.

SURVEYING—By Raymond E. Davis, Francis S. Foote, W. H. Rayner. Second edition. Fabricoid; 5x8 in.; pp. 1032; photographs, tables and diagrams. McGraw-Hill Book Co., Inc., New York. $5.

TWO revised editions and one new book on surveying have been published within the past few weeks. Two are concerned with the general principles of the art, and one relates only to higher surveying.

The new book, "Engineering Surveys," by Prof. Harry Rubey of the University of Missouri, has been prepared as an addition to the Macmillan "Engineering Science Series." Essential logarithmic and trigonometric tables are included. The text is clear and concise and covers the fundamentals of the principal types of surveys except aerial surveys. Illustrations are well chosen.

The principal revisions of Breed and Hosmer's "Higher Surveying" are in the chapters relating to aerial surveying. These have been rewritten and expanded to cover new developments. Other chapters also have been rewritten or expanded.

"Surveying," by R. E. Davis, F. S. Foote and W. H. Rayner, has been entirely rewritten. The number of text pages is double that of the first edition, and the amount of new material added has been increased further by setting detailed explanations in small type. Important new material includes chapters on photographic surveying and on hydrographic surveying and flow measurement.

A Novel Treatment of Structural Frames

Reviewed by Robins Fleming
American Bridge Co., New York, N. Y.

STRUCTURAL FRAMEWORK: A New Method of Analysis, with Tables—By Thomas F. Hickerson. Paper 8½x11 in.; pp. 147; illustrated. Published by The University of North Carolina Press, Chapel Hill, N. C. $2.

PROFESSOR HICKERSON has made a valuable contribution to the literature of rigid-frame structures. It is original, novel and practicable of application. Part I is devoted to members with constant moment of inertia, and Part II to members with variable moments of inertia. In Appendix A there are 50 tables. Appendix B is a treatment (not found elsewhere) of bending and direct stress. Appendix C is an analysis by approximate methods of tall building frames.

Bending moments in continuous beams or other statically indeterminate structures are determined in terms of the "fixation factors" of the several members at points of support. The formulas are built up from the fundamental equations of the slope-deflection theory. The stiffness of members, the K values (I/L, or moment of inertia divided by length) and the carry-over values are dominant factors in what may be called the Hickerson method. These are much more complex for variable moment of inertia than for constant moment. The author in this portion of his book has concrete structures specially in mind. However, a steel bridge with a clear span of 99 ft. 1½ in. of similar outline as the rigid-frame concrete bridge of Fig. 53 is now being built over the Astoria Boulevard for the Long Island Park Commission. Another steel bridge of similar outline is being built over the tracks of the Pennsylvania Railroad within the city limits of Philadelphia.

Tables throughout the book, 69 in all, representing an enormous amount of work, are given to expedite calculation. The numerical solutions of illustrative examples are a great help in understanding the application of formulas. Fixed-end moments are distributed by a single cycle of operations.

Secondary stresses are found of the Warren truss analyzed in Ketchum's "Steel Mill Buildings," where a slope-deflection method is used. This same truss is analyzed by F. A. MacLean (*Transactions*, Am.Soc.C.E., Vol. 96, p. 123) in his discussion of the Cross method of distributing fixed-end moments. An interesting comparison of the three methods can thus be made.

The book of Professor Hickerson should be in the possession of every instructor of structural engineering. A knowledge of its contents is necessary for him to be fully equipped for teaching the determination of stresses in rigid frames. The book is recommended to the practicing engineer for study and consideration. The extent to which he will adopt its methods depends upon the personal equation.

New Books and Revised Editions

[Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.]

AMERICAN CIVIC ANNUAL—Edited by Harlean James. Cloth; 5x8 in.; pp. 278; photographs. Published by American Civic Association, Washington, D. C. *A collection of short articles on national, regional and state planning, also a list of members of the American Civic Association.*

THE AMERICAN RAILROAD IN LABORATORY: Volume II, Saving Life and Limb—Compilation by American Railway Association. Paper; 6x9 in.; pp. 210; photographs and tables. Published by American Railway Association, Washington, D. C.

THE DESIGN OF RESIDENTIAL AREAS—By Thomas Adams. Cloth; 7x10 in.; pp. 296; photographs, diagrams. Published by Harvard University Press, Cambridge, Mass.

ELEMENTS OF WATER SUPPLY ENGINEERING—By Earle Lytton Waterman. Cloth; 6x9 in.; pp. 302; photographs, diagrams and tables. Published by John Wiley & Sons, Inc., New York. $3.50.

HIGHWAY DESIGN AND CONSTRUCTION—By Arthur G. Bruce. Fabricoid; 6x9 in.; pp. 628; photographs, diagrams and tables. Published by International Textbook Company, Scranton, Pa. $4.

PORTS OF PORT ARTHUR, SABINE, BEAUMONT, AND ORANGE, TEXAS. Port Series No. 14 (Revised 1933). Prepared by The Board of Engineers for Rivers and Harbors, War Department. In cooperation with the Bureau of Marine Development, U. S. Shipping Board. Published by the Superintendent of Documents, Washington, D. C. 40c.

WATER POWER ENGINEERING—By H. K. Barrows. Second Edition. Cloth; 6x9 in.; pp. 762; photographs, diagrams and tables. Published by McGraw-Hill Book Co., Inc., New York. $6.

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The Cities' Experience

A SIGNIFICANT pronouncement on public-works construction as the means of economic recovery is contained in the statement made last week by the executive committee of the United States Conference of Mayors, in connection with the steadily expanding problem of unemployment relief. City executives have had saddening experiences with the effects of unemployment, and they evidently recognize that present palliatives are getting nowhere. But their own proposal for an enlarged work-relief program carries little conviction in the face of the ineffectiveness and often disorganizing influence of present work-relief systems. The real force of their recommendations lies in the statement that "The best stimulus to recovery is a federal public-works program promoted on such a scale as to make an impact upon private industry." Here they recognize the need for a truly constructive type of activity, and the folly of expecting to reclaim the nation's economic life by wasting its productive power in a dole system. Adequacy of scale and rapidity of mobilization of a construction program are of course vital to the purpose of starting up the stagnating flow of industry and business, which is the ultimate objective.

The Price of Fame

COMPTROLLER-GENERAL MCCARL has ruled that the death of the famous architect Cass Gilbert terminated the contract between the federal government and the firm of Cass Gilbert, Inc., on the nearly completed U. S. Supreme Court Building in Washington. The contract was interpreted as calling for the personal services of Mr. Gilbert. This interpretation is commonly placed on contracts in such fields as portrait painting or sculpture, so that it may be proper to extend it to architecture. But it would seem essential to examine each case on its merits. In early times the architect was invariably the fountainhead of knowledge and genius in his organization. But today, with architecture often on a big business basis, it is more difficult for the head of the firm to be the originator of all the designs for which he may be given credit. The same conditions obtain in engineering firms, although the true state of affairs is probably more widely appreciated in the engineering than in the architectural field. There is food for thought in the comptroller-general's ruling, especially as it may bear on some of our large engineering corporations.

Hope for Action

THE LARGE-SCALE slum-clearance program sponsored by the federal government through the RFC, the PWA and now the PWEHC has never been open to the criticism of non-activity. But the sad fact is that the nature of the activity has seemed to border more often on turmoil than on result-producing action. Good and sufficient reasons have existed for this state of affairs, but the lack of progress has been discouraging. Four recent developments seem to offer, at last, real hope for productive action. The first of these was the decision of the U. S. District Court in Cleveland that federal condemnation proceedings, to obtain land for housing, were legitimate and in the public interest. This decision should expedite land acquisition, by far the most time-consuming element of a housing program. The second prominent development was the actual acquisition of land for a project in Cleveland after a year full of despairing episodes. Then, there is the announcement this week that condemnation proceedings on a 37-block area have been started in Chicago. And, finally, there is the plan worked out between the federal government and the New York City Housing Authority for release of the funds that have been earmarked for that city. With the court decision in its favor and with the New York agreement pointing the way to a practical policy with respect to other cities having municipal housing authorities, the Public Works Emergency Housing Corporation would seem to be in a position to put its capital of $125,000,000 to productive use quickly.

De-Aired Paving Brick

DE-AIRING THE CLAY before it passes to the forming die undoubtedly assumes rank as one of the great improvements in paving-brick production. It serves moreover to call to mind that recent years have brought vital improvements in this oldest of all paving materials except possibly the bitumens. With the simplification of brick sizes to six from more than sixty, a very few years have brought to the service of the paving engineer the wire-cut brick with vertical fiber and spacing lugs, and a reduction of from a quarter to a third in brick thickness. To these are now added through de-airing a stronger and less absorptive brick and one that is produced with a far smaller proportion of rejects or second-quality units. These advances in brick quality combined with advances in the art of brick-pavement construction such as increased perfection in base finish, the use of thin cementitious bedding and processes for removing surplus joint filler are represented in the Philadelphia paving work described in this issue and make its study important. In particular, the new de-aired brick seems worthy of the study which, as noted in the article mentioned, is being centered on it by road engineering organizations.

Drivers Always Sinners

RIGHTS OF THE ROAD appear not to be an exclusive possession of the motor-car driver in London. About a month ago the Transport Minister forbade the honking of horns at night. Probably the purpose was primarily to promote night rest, but incidentally it compelled drivers to consider the pedestrian beyond "giving him the horn." Now the minister has issued the radical proclamation that it is the positive duty of the motorist "to give priority to the pedestrian." To aid both classes of traffic, he will establish warning beacons at some 10,000 crossings, but irrespective of warning signs the obligation remains with the car driver to safeguard the pedestrian at these points. In furtherance of this, one vehicle may not pass another on crossing zones. From American experience these safeguards appear less positive and certain than to clear the right-of-way alternately for vehicles and for pedestrians. The fault of this plan as executed has been that no restraint is put on the pedestrian from stealing if he can the right-of-way allotted to the vehicle. This is the cause of most

of our vehicle-pedestrian collisions. Perhaps the London practice of making the vehicle always the offender may be the cure, although it seems unfair to the vehicle.

Highway Design and Travel Speeds

MOUNTING SPEEDS of highway travel are arousing concern among highway engineers. At the speeds that now prevail a road built only ten years ago is obsolete as a track for the vehicles which travel it, even though it has ten or more years of structural life remaining. Will the roads that are being built today similarly become obsolete ten years from now?

Such rapid obsolescence obviously may not be tolerated. The roadbuilder long ago recognized the problem, and sought to find a solution in his early attempts to prescribe maximum travel speeds. But the road user soon overruled him, with the active support and assistance of enforcing agencies and legislatures. Other solutions are being attempted.

In Indiana the head of the highway commission has proclaimed a doctrine of coordinated speed design of road and automobile—a road suited to a certain maximum speed and a vehicle made incapable of exceeding that speed. In Oregon, on the other hand, the highway authorities have adopted the plan which we noted a few weeks ago: namely, to locate and design their main roads for 90 to 100 m.p.h. travel speed. Connecticut, with New England conservatism, has sought facts before committing itself to a definite course. It has conducted a speed census as a basis for the formulation of policies; covering 45,000 timed cars, this census disclosed an average speed of 41.2 m.p.h. and a maximum speed of 77 m.p.h., buses averaging some 2 m.p.h. faster than private cars. Considering the observed average speeds, most Connecticut main roads will probably long be capable of efficient service, but it is doubtful whether more than a few of them are adequate for the maximum speeds even of today, much less those that may be prevalent five and ten years from now.

Contemplating these diverse attempts to deal with the problem, one is compelled to recognize the hard fact that speeds have increased to a point which not long ago would have been considered beyond reason. Old-time notions of safety to the general traffic stream were dispelled when the too-long-maintained enforcement of 30-m.p.h. regulations broke down. The fact also is clear that present-day speeds are an index of road service demands, and that the increase of speed which resulted from improvement of surface—always the chief speed-limiting factor—compels recognition by the highway engineer. It is his duty to design roads for the needs of the service, not for his own preferences or convenience.

Many elements of road construction affect speed, but not all of them can be developed to their ultimate limit in the initial design without violating the dictates of economy. Fortunately, only a few are inherent in location or basic design; the others are capable of rectification and revision later on. The more fundamental elements include alignment, sight distance and special hazards, and these are of such kind that the original design can usually be made such as to provide for a large increase in service demands.

Present facts suggest the general conclusion that road speeds will find a practicable limit not far from the speeds that have developed in first-class railroad practice. Decision of the speed-limit question can hardly be pushed beyond this point at present. A sound rule, then, is that main roads should be so located and designed that in general they are adapted to unrestricted speed, within the range of railroad practice; that sight distances should be correspondingly adjusted; that special limitations at certain points or in certain zones should be recognized by lower-speed design, and adequately posted; and that the design be worked out in such manner as to provide for ready revision of width, shoulders, sidings, bridges, intersections, access paths and the like. On present outlook a design of this kind promises to be capable of serving for an indefinite period in the future.

Planning for Water Use

THE CONDITIONS that led up to the establishment of the Mississippi Valley Committee within the Public Works Administration and the considerations that had an important bearing upon the committee's development of its policies are set forth in this issue by Carey H. Brown, first secretary of the committee. The policy-forming considerations enumerated by Mr. Brown are of specific significance because they have a very direct bearing upon the effectiveness of the planning now being carried forward by the water resources section of the National Resources Board. Also, they indicate how essential to the execution of that planning will be cooperation by the states.

The federal government alone cannot lay down and enforce compliance with a national plan for water-resource development due to the fact that its control over rivers is limited to control over such changes in the regimen of a river as may adversely affect navigation of the stream. For the same reason, the federal government has never accepted responsibility for the cost of river regulation works other than for those affecting navigation. It is true that this limitation upon federal control has been widely extended by the Federal Power Commission on the one hand in reaching out to control water-power development and by local communities on the other hand in obtaining federal aid to finance such undertakings as levee construction on the Mississippi. Nevertheless, the federal government's interest in conservation and use of water resources is so restricted as to nullify any attempt to extend it to cover all kinds of water use. The states must cooperate in more complete control.

The need for wholehearted cooperation by the states with the national government in the planning for the conservation and use of our water resources is the most important conclusion to be drawn from Mr. Brown's summary of the problems placed before the former Mississippi Valley Committee. Water conservation in the first instance is the responsibility of the state or states in which each watershed lies. Planning for it must be based upon the needs of the region; it should be inaugurated by a regional state or interstate body. But as few watersheds are unrelated to larger river systems, and as there should be the greatest possible uniformity on such matters as preferential use and allocation of costs, no local body should be permitted to function independent of its neighbors. In national policy forming and in meeting the larger regional development problems we may look to the National Resources Board for the lead. Carrying the planning to execution remains a local function.

CURRENT NEWS

PWA Inaugurates Slum-Clearance Plan in Chicago

IN one of the largest urban real estate developments ever undertaken, PWA started action this week for acquiring 160 acres covering 37 blocks southwest of the Loop section of Chicago, and just east of Cook County Hospital. Estimated to cost $12,500,000, the slum-clearance project will house 3,000 families. This sum represents half the fund budgeted by PWA for its housing program in Chicago. Involved in the transaction are 1,009 parcels of land and many streets and alleys. Seventeen public and semi-public parcels will be exempt from condemnation, and the schools, churches, playgrounds, park and fire stations occupying them will be left intact.

Cash prices to be paid by the government for private property will be fixed by the value of the land, determined as of Sept. 25, the date that PWA filed its petition in federal court. "A fair and just market price will be allowed every property owner, but if we find that any type of hold-up is being attempted," said Secretary Ickes, "or that the land will cost too much to produce true low-cost housing, we will drop the project and go elsewhere. While the government favors this particular site, we are not tied to it."

The project embodies the largest single land assembly on record and involves many complicated factors such as the settlement of taxes due on individual parcels. As an outstanding benefit to the city, sale of the property to the government will mean full payment of all delinquent taxes. Owners may elect voluntarily to sell their land to the government at fair market value, but otherwise will be summoned to court and a fair market price will be found by jury. When sufficient options have been obtained voluntarily, the government will file a "declaration of taking," vesting title to the entire tract in the United States, and will deposit with the court funds for payment of parcels taken by condemnation, paying cash for property sold voluntarily.

Several months will be required to complete the land assembly under the most favorable conditions. The government's end of the transaction will be handled by Frederick Z. Marx, of Chicago.

All buildings except the exempted property will be demolished, and most of the streets and alleys which the city will be asked to vacate will be closed. The new housing will consist of two-, three- and four-story walk-up apartments and some row houses, of fireproof construction and arranged to give occupants a maximum of light and air. Residence construction will occupy only 25 to 30 per cent of the land, the remainder being devoted to streets, serviceways, park and recreational spaces, service buildings, garages, community facilities and stores. Cooperation has been pledged by Mayor Kelly.

Construction Contract Approved For Grand Coulee Dam

After weeks of delay resulting from the problem involved in securing the surety bonds for the Grand Coulee dam award, the $29,339,300 contract has been approved. The group of contractors submitting the low bid has recently announced formal incorporation under the name of Mason-Walsh-Atkinson-Kier Co.

The final consummation of this contract will accelerate the preliminary construction operations which are already under way at the site. The contractor has already cleared and graded the construction camp site and expects to have 2,000 men housed and at work by Nov. 15. The Bureau of Reclamation will open bids Oct. 12 for the construction of a school at the government town. The structure will cost about $25,000.

Japanese Typhoon Causes Damage Totaling $300,000,000

Described as a disaster second only to the earthquake of 1923, the typhoon which struck Japan Sept. 21 resulted in deaths exceeding 1,600, with estimates of property damage exceeding $300,000,000.

Preliminary compilations made by the Home Ministry, according to reports, indicated the following:

Buildings destroyed.....	18,390
Buildings washed way...	862
Buildings damaged .	22,037
Buildings flooded	169,873

The damaged buildings included the wrecking of several hundred school structures. In the textile section of Osaka more than 3,000 factory buildings were destroyed and thousands of others damaged.

Construction League Urges Modifications in PWA

Urging change in practices of "uneconomical and disruptive character" in the administration of the emergency public works program, the Construction League of the United States has appealed to President Roosevelt to correct these evils before they cause greater damage to the construction industry. The letter was signed by President A. J. Hammond, of the Construction League, and criticized (1) the exclusion of recognized architects, engineers and contractors from designing and building jobs on CWA projects; (2) the order of the President of June 29, 1934, permitting building material suppliers to cut their open prices as much as 15 per cent on materials sold to governmental agencies, and (3) the order of the Secretary of the Treasury of the same date, barring architects in private practice from engagement by the public works section of the procurement division on major projects in the current building program.

The letter highly commends the spirit of the federal recovery effort, but appeals to the President to sponsor the corrections suggested.

Federal Housing Financing Available for Municipalities

Financing under the Federal Housing Administration is available for municipalities throughout the country, according to a ruling made public Sept. 10 by the FHA. The ruling was made in response to numerous requests from municipalities requesting information on whether they could take advantage of the federal housing act in making municipal improvements.

Federal Court Ruling Prevents PWA From Financing Municipal Power Plant

IN a ruling handed down by United States District Judge Albert L. Reeves, Western District of Missouri, it was held that the PWA has no constitutional authority to aid the city of Concordia, Mo., in the construction of a municipal light and power plant and that "if it was intended by Congress that this federal agency was to promote that character of construction work, then this purpose impinges on constitutional inhibitions and is therefore invalid." The suit was brought by the Missouri Public Service Co. to prevent the city from constructing a municipal light and power plant with a PWA grant of $17,000 and a loan of $30,000.

Judge Reeves held that the state has exclusive right to control the manufacture, sale and distribution of electricity in Missouri and therefore it must follow that if Congress has no power to control the generation of electricity it would have no power to grant aid in the construction of a plant over which it has no legislative authority. In the decision the judge overruled a motion presented by counsel for the city to dismiss the suit. The court cited rulings of the state supreme court to support its contention that the existence of an emergency did not change the status of the issues involved.

The decision affects a number of similar PWA projects in Missouri and an appeal in the present case is expected. The Missouri Public Service Company serves the town of Concordia with electricity. The PWA administrator filed a brief in the present case.

The PWA intends to reappraise its policy on financing of public ownership of utilities, according to reports, as a result of the decision. Administrator Ickes holds the ruling of the court untenable and is more directly concerned over the recent rate reductions made by some private utilities which make it impractical for publicly financed projects to compete.

Code Authority Acts To Force Contractors To Pay Assessments

FIRST disciplinary action against general contractors who have failed to register their work and pay assessments to the Divisional Code Authority for General Contractors, as required by Chapter II of the construction code, is expected to start this week in many states, when the prescribed 30 days' period of grace, following formal demand, has elapsed for the first lists of delinquents.

Notice of contribution due, as required by NRA (Administrative Order No. X-36) has been sent by the various state administrative agencies during the past month to all delinquents and in each case where payment is not made within the prescribed thirty days, or where a formal protest against the assessment is not pending, the respective agencies will immediately certify the fact of non-payment of contribution to the state trade practice complaints committee, which, in turn, will take appropriate legal action against the delinquents for violation of the code. The maximum penalty provided by the National Industrial Recovery Act for code violations is $500 for each day that the violation occurs.

The divisional code authority has been especially careful in instructing its state agencies as to the proper procedure to take against delinquents and in seeing that NRA requirements are strictly adhered to, so that evasion of the assessments through technicalities may be prevented. The divisional code authority reports that comparatively few formal protests have been received against the assessments from general contractors, and, generally, these are based upon ignorance of the code provisions.

Joint committee

Another important step in code administration progress announced by the divisional code authority for general contractors is the setup of a joint committee of the construction industry and the river and harbor industry to handle border line cases, which might involve a question of code jurisdiction. An early meeting of the committee to deal with some of the uncertainties and misunderstandings which have arisen in connection with the two codes is expected. With this joint committee established and recognized by NRA, the divisional code authority announces that it is now ready to handle inquiries from general contractors, who, after studying a project and the definitions contained in the two codes, are still in doubt as to which code covers the specific project. Where necessary the divisional code authority will seek a ruling from the joint committee on any particular case. The ruling would be made by a majority vote of the committee, with provision made for the appointment of a disinterested seventh member of the committee in the event of a tie vote.

The authority points out that the construction industry codes govern all construction operations on rivers, harbors and waterways, excluding only dredging, submarine rock removal, land reclamation by dredging, marine and subaqueous work in rivers, harbors and waterways, when done *principally by marine plant and the crews thereof.*

H. M. King Made President of the N.E.W.W.A.

Howard M. King, superintendent of the Springfield, Mass., water department, was elected president of the New England Water Works Association at the annual convention held in Boston, Mass., Sept. 18 to 21. Mr. King succeeds E. Sherman Chase, consulting engineer, of Boston.

The Dexter Brackett Medal was presented to Caleb Mills Saville, manager and chief engineer of the Hartford, Conn., water bureau for his paper entitled "Some Phases of New England Hydrology."

Two honorary members were selected by the association: Frank Barbour, consulting engineer, Boston, Mass., and William James Eames Binnie, consulting engineer, London, England.

South Pier, Golden Gate Bridge, Ready for Floating Caisson

Activities on the south pier of the Golden Gate Bridge at San Francisco recently have centered around the work of divers engaged in cleaning off the bottom of the area enclosed within the fender ring. This ring has been completed up to the point where it is in readiness for the pier caisson to be floated into place. Divers reported very little loose rock and the bottom was prepared for concrete in only a few days.

First concrete in the seal was placed Sept. 17 and the time at which the caisson will be floated into place was tentatively set at Oct. 10. With the caisson inside the fender, the remaining eight fender units on the easterly end of the ring will be raised to their final level of El. 15. This will completely enclose the caisson in a pool of still water where it is to be sunk to final position within the shelter of the fender.

WASHINGTON MONUMENT TO GET FIRST BATH

Financed by a $100,000 PWA allotment, the famous Washington Monument will be cleaned after it is enclosed in scaffolding for its full 555-ft. height.

Union Organizers Halt Highway Work in Missouri

HIGHWAY widening operations carried on by relief labor on a route between Imperial, Mo., and the Meramec River were halted for three days by about 75 men claiming to represent the International Hodcarriers Union, who stated they would not permit the work to continue until the relief workers employed on this project had joined the union. After the operations had been suspended from Sept. 17 to 20, work was resumed under the protection of a special guard of deputy sheriffs.

The Davis Construction Co., Boonville, Mo., which holds the contract for this highway work, has an agreement with the state highway department to use only men on relief rolls for this widening work. It is estimated that the job will employ 250 men throughout the winter. Wages were set at 45c. an hour for unskilled workers, 65c. for semi-skilled, and $1.10 for skilled labor. The organizers, according to reports, insisted that the pay should be raised to 65c., 78c. and $1.25 an hour. The work was ordered stopped on Sept. 17 to avoid trouble.

The workers, most of whom had been unemployed and on relief rolls for months, notified the Jefferson County Relief Committee, which met Sept. 19 to discuss the situation, that they were satisfied with the wages being paid and wished to continue the work. Protection of the relief workers from interference was requested of the sheriff of Jefferson County and on Sept. 20 the widening project was resumed.

California Structural Engineers Meet to Study Earthquake Laws

Discussion of existing and proposed legislation on earthquake resistant design in California is still alive. Proposals include the possibility of ammending or repealing the two existing bills, passed as a result of the 1933 earthquake in Long Beach, or the passing of new measures. Repeal of the existing laws is considered the extremist point of view.

The Structural Engineers Association, including both the northern and southern groups, plans a joint meeting Oct. 11-13 for the purpose of getting representative engineering and architectural organizations into agreement on the matter of legislation for earthquake design so that a united front can be presented at the next legislative session. To improve the prospect for reaching such an agreement, the structural engineers have invited representatives of the architects to attend and also the presidents of the four California sections of the Am.Soc.C.E.

Record Rainfall for September in Washington, D. C.

Precipitation for the first 16 days of September in Washington, D. C., has totaled 13.42 in., which is a record for September rainfall in the national capital. The previous record of 10.81 in. was reported in September, 1876. A rain of 4.01 in. on Sept. 14, which caused some flood damage, was followed by 2.03 in. of rain on Sept. 16.

Mayors' Conference Outlines Program For Relief Work

AT the conclusion of its recent conference, the executive committee of the United States Conference of Mayors prepared a statement outlining its position on unemployment and relief problems. The report contained no radical proposals and the suggestions were along the lines of relief which has been carried out by municipalities and the federal government during the past two years. The statement, however, provides a definite program and recommendations for handling the relief problem. Its major points are abstracted in the following.

Long-time program

The executive committee accepts the unemployment problem as one which will not be relieved by ordinary changes in conditions during the next few years and, as a result, necessitates thinking in terms of a long-time program. Dividing the unemployed into two classes, (1) those unable to find employment and (2) those mentally or physically unfit for employment, the statement indicates the committee's approval of the existing practice of local responsibility for the second group. However, for those permanently and involuntarily unemployed, as the result of changed economic conditions, the mayors consider the problem one which necessitates the establishment of a federal program.

As part of the long-time program, a nationwide system of unemployment insurance is considered necessary. Such an insurance plan would be administered by the federal government and the required financing would be secured from current revenue.

As distinct from the long-time program for unemployment relief, the committee acknowledges the serious immediate conditions and considers a federal work relief program imperative. For such a program, the cost of materials should be provided as well as direct labor. A closer cooperation between municipal governments and federal relief authorities in the selection and administration of works projects is urged.

Public works urged

In commenting on the works program the statement continues: "We have from the outset of our conference and still do hold steadfastly to the belief that the best stimulus to recovery is a federal public works program promoted on such a scale as to make an impact upon private industry. Such a program not only lessens the burden of relief but provides the method by which the cities and states of the nation can be enriched by the expenditure.

"The nation is confronted with a severe shortage in housing which is being augmented very rapidly by the failure of building operations in this field. There is not only need of a general demolition and rebuilding of our slum areas but we must also provide for low-cost housing to help those not otherwise able to acquire or gain possession of a home. In neither field has private capital in the past or in the present been able to operate. All other modern nations have been compelled to attack this problem as a social undertaking. We suggest financing and general supervision of such a program by the government as offering one of the best means of employing labor and stimulating business.

"Second in importance is a provision for the financing of self-liquidating public works. The only obstacle to the promotion of such enterprises in large numbers by local governments and states is the difficulty of obtaining immediately the funds required to commence operations now.

"Next in order in the great field of public construction are those public facilities such as schools, public buildings, and so forth, from which the locality derives no direct revenue. Finally, we suggest that many localities are prepared to promote in a major way the abolition of present street crossings over railroads and interurban lines at grade, if only they can be financed.

"Such a public works program as is here outlined can proceed without straining the credit of the federal government or of cities by the initiation of a fiscal policy which will allow cities to use their full available credit resources in combination with the financial agencies of the United States. At the same time such a program will lessen the interest burden now resting on local governments."

Samuel M. Fisher Made Head of Los Angeles Flood Control Work

Samuel M. Fisher has been appointed chief engineer of the Los Angeles County Flood Control District by the county board of supervisors. He has been serving as acting chief engineer of the district since the announced resignation of E. C. Eaton.

Mr. Fisher was appointed by a vote of four to one, Supervisor Quinn voting against the appointment on the ground that the board had previously requested the Am.Soc.C.E. to make a recommendation relative to an engineer for the position (*ENR*, Sept. 13, 1934, p. 351) and had then proceeded to take action without waiting for this recommendation.

Mr. Fisher graduated from the University of Wisconsin in 1909 and, following several years of railroad and general professional work in the mid-West and California, became connected with the Los Angeles county flood control work in 1919 as a field engineer in charge of constructing several of the flood control dams. He worked on the preliminary design studies of the flood control program made in 1923 at the time of the original bond issue. Following an interval of several years, in which he engaged in private practice, Mr. Fisher returned to the engineering staff of the district about 18 months ago.

Home Modernization Program Makes 4,412 Loans With Acceleration in Volume Expected

(Washington Correspondence)

HOME modernization has not moved at the speed hoped for under the stimulus of the National Housing Act, with only 4,412 loans totaling $2,026,000 reported to Sept. 21, but FHA officials are confident of strong acceleration. Pointing out that reports to Washington headquarters lag 3 weeks behind actual transactions, they continue to maintain their estimate of a $1,000,000 a day volume. It is claimed that the modernization drive also is generating $2,000,000 a day in cash business.

Loans analyzed

The reports actually in hand are significant in revealing the characteristics of individual loans. The average is $459 with maturities varying up to a maximum of 25 months. An unexpectedly high average income of $2,955 reveals that borrowers are conservative as they have obligated only 7.4 per cent of their annual income. This evidence of the soundness of the risk is supplemented by an analysis of 718 loans revealing that only 154, or 21.4 per cent of the borrowers previously had borrowed money from the institutions to which they applied for modernization credit. The analysis was based on a review of 718 loans but is considered an indication that FHA has stimulated the flow of credit, and created work that home owners probably would not have undertaken.

Among the 718 borrowers, 131 or 18.2 per cent are employees of the federal or local governments and 135 or 18.8 per cent are clerks. Skilled mechanics account for 13.3 per cent, business men (sole owners) 12.8 per cent, business men (partners) 3.9 per cent, salesmen 6.6 per cent, corporation officers 5.9 per cent, unskilled laborers 4 per cent, landlords renting rooms and apartments 3.9 per cent, department heads 3.9 per cent, professional men 3.6 per cent.

Heating, inside painting and redecorating and plumbing share something less than half of the total jobs about equally. Jobs classified according to type are: heating 14.5 per cent, inside painting 14.4 per cent, plumbing 13.8 per cent, exterior repairs 9.7 per cent, roofing 9.2 per cent, outside painting 9.2 per cent, general remodeling 8.5 per cent, interior repairs 5.5 per cent, cementing 3.9 per cent, lighting 3.5 per cent, bathroom remodeling 3 per cent, additional rooms 2.4 per cent, kitchen remodeling 1.9 per cent.

National distribution

The national aspect of the modernization program is spotty. In several states usury laws antedating the installment selling principle present obstacles that have to be encompassed by special procedure. Although loans reported to Sept. 21 were made by 838 institutions in 45 states, National City Bank, New York, accounts for 16 per cent of the total number with 740. Financial and commercial interests are apprehensive that the administration, having built up great expectations from the modernization program, will be tempted, if the program fails, to go directly into housing construction by the government. Home mortgage financing is scheduled to get under way next month under the direction of J. Howard Ardrey, Dallas and N. Y. banker, who was prevailed upon to accept the post of deputy administrator by Jesse Jones, RFC chairman.

Southwest Engineering Progress

Conservation and channel improvement projects along Rio Grande River outstanding—Improvements in Dallas—Rising agricultural prices and break in drought improve general conditions

(Special Correspondence)

DALLAS, TEXAS, Sept. 24—The valley of the Rio Grande River is the present center of construction activity in the Southwest. The Middle Rio Grande Conservancy District in New Mexico is nearing the end of its extended construction program which has included storage dams, irrigation and drainage canals and general river control and conservation development. The work of this district probably will be completed this year.

Below El Paso, in what is locally known as the Lower Valley, extending from Mission to Brownsville, construction activity is marked by several navigation improvement projects and channel rectification which is scheduled to start in the near future as a joint program by the federal governments of the United States and Mexico. [An article reviewing this international river control work will appear in next week's issue.—EDITOR.]

Channel dredging

At Point Isabel jetties are under construction to improve the ship channel. Bids have just been received on the ship channel dredging from Point Isabel to Brownsville.

On Aug. 31 bids were received for dredging 1,260,000 cu.yd. of material to straighten the channel of the Arroyo Colorado as part of the flood control work in the lower valley. At El Paso the rectification of 80 miles of the Rio Grande channel is progressing and bids called on this work represent the dredging of about 2,800,000 cu.yd. of earthwork for channels and levees.

Announcement has been made that construction is to start soon on the development of a large irrigation tract in the lower valley to be financed from private sources. The Texas state highway commission has a large volume of work under way in highway relocation and grade separation, and is steadily initiating new projects.

Dallas, after months of discussion on the allocation of costs, is starting construction of a $750,000 underpass and railroad grade separation which is to effect a major improvement in traffic conditions in that city. Also, the city and the Dallas Levee District have just awarded contracts for a joint storm sewer project to cost $320,000.

Private building

The Humble Oil Co. is erecting an office building in Houston. The Gulf States Life Insurance Co. has announced plans for a six-story addition to its building in Dallas. These structures, with the irrigation project already mentioned, include about all of the important projects which have been announced for private financing.

PWA work in Texas, outside of federal construction, has not made any notable progress. FERA is using a large number of engineers in engineering and executive capacities in connection with its relief program.

The Texas Centennial Commission, which is planning an exposition in 1936 to celebrate the hundredth anniversary of the founding of the Texas Republic, has awarded the site of the centennial to the city of Dallas after receiving bids from several cities. It is expected that state funds will be available to assist in financing the project.

A special session of the Texas legislature was called by the governor to authorize the sale of the $9,500,000 balance of the $20,000,000 bonds issued for relief work. Administration of the state relief work in Texas may be placed in the hands of the State Board of Control.

General conditions

Thirteen-cent cotton will bring considerable wealth into the state and, although the crop is short in some areas, the gross income will be relatively large. The citrus crop in the lower Rio Grande Valley is not large, but an excellent price is expected. The general water shortage over the state is gradually being overcome by recent rains, although in some sections there is still a deficiency which represents a continuation of the severe conditions of the summer's drought.

An unusual announcement made by the water department of Dallas, to encourage the preservation of lawns and shrubbery, permits all water used during the balance of the summer months, in excess of the customer's average bill for the months of May and June, to be sold at 4 cents per 1000 gallons.

Port Authorities Consider Problem of Fire-Safe Structures

MEANS for building pier and wharf structures that will be much more fire-safe than are most such structures today stood out prominently among the many subjects discussed by the American Association of Port Authorities held in New York, Sept. 9-13. Other subjects included a historical statement on the development of American harbors by Maj. Gen. Edward M. Markham, Chief of Engineers, U. S. Army, and an address by Joseph B. Eastman, Federal Co-ordinator of Transportation, on the relation of his work to the subject of port development.

Fire prevention

The problem of a firefighter in handling waterfront fires was the subject of an illustrated talk by John J. McElligott, fire chief and commissioner, New York City, former head of the marine fire department of the city. Mr. McElligott cited the elements of existing waterfront structures that hamper the firefighters and that facilitate the rapid spread of fire, and outlined in detail how piers and wharf structures could be built to localize fires and to facilitate fighting them. He also presented for the consideration of the association an ordinance putting many of his recommendations into effect which he has had drafted for consideration by the city's legislative body.

The fire prevention committee in its report called the attention of the asso-

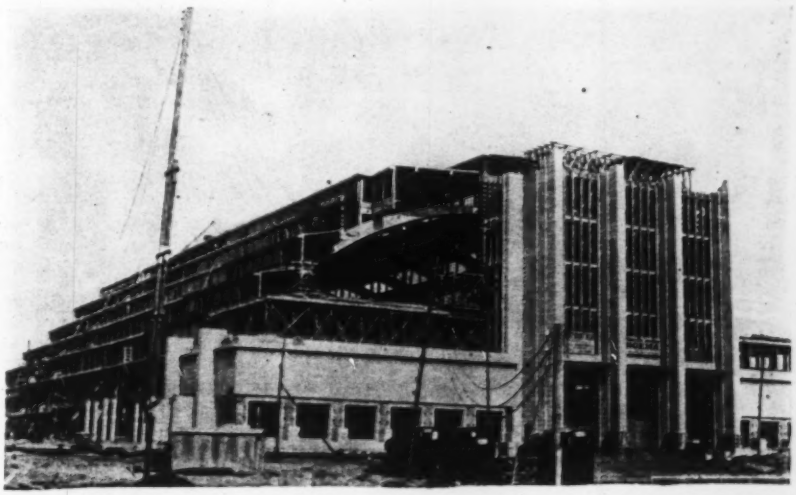
MAIN BUILDING FOR 1935 WORLD'S FAIR IN BRUSSELS

Rapidly nearing completion, this unique structure, whose principal framing consists of twelve 3-hinged reinforced concrete arches of 282 ft. span and 102 ft. rise, will comprise the central building or Grand Palace of the Universal and International Exposition to be held in Brussels, Belgium, in 1935. Some 3¾ acres of floor space, free of columns, is provided under the roof.

Each arch has a width of 3.25 ft. and a depth varying from 6 ft. at the base to 3.25 ft. at the crown. Thirty tons of round-rod reinforcing is used in each half arch. The reinforcing was assembled on the ground, in three sections for each half arch, by arc welding, and lifted into place on steel arch-truss falsework.

The concrete, made with 1.8 barrels of rapid-hardening cement per cubic yard was placed by concrete pumps capable of forcing it 650 ft. horizontally and 130 ft. vertically. The concrete was vibrated.

The building enclosure is concrete framing and windows in the form of stepped terraces, with the end facades finished as shown.



ciation to the fact that the committee on piers and wharves of the National Fire Prevention Association will devote its fall session to the problem of under-deck pier fires. The committee also outlined recent developments in the use of wrought iron diaphragms under the decks of piers to check the spread of fire, also developments in apparatus for fighting fires under piers.

On account of the illness of Maj. Gen. Edward M. Markham, his paper on the development of American harbors was presented by Lieut. Col. G. R. Lukesh. General Markham outlined the history of harbor and port development work in this country since Congress in 1802 appropriated $30,000 for the construction of public piers at Philadelphia. In 1824 Congress authorized the Corps of Topographical Engineers to prepare surveys and estimates for such roads, canals and rivers improvements as the President might deem of national importance, thus inaugurating the work since carried on by that corps and by its successor, the Corps of Engineers, U. S. Army. In 1826 Congress passed the first river and harbor bill appropriating $150,000. Since the original $30,000 appropriation Congress has appropriated in all $2,000,500,000 for the improvement of operation and maintenance of our waterways.

General Markham pointed out that in 1929 the tonnage carried on our harbors and waterways aggregated almost 900,000,000 tons, valued at 36 billion dollars at a cost to the federal government per year of only 3 cents per ton of commerce handled.

The work of the board of engineers for rivers and harbors was reviewed in detail by General Markham and he cited that board's work as an example of the advantages to be obtained from a continuing program of planning well in advance of actual execution.

Rail-water relations

A potential source of needed income for the railroads of the country is the termination of their present general practice of granting free dockage to ships using the railroad-owned terminals in the ports of the country, according to Joseph B. Eastman. Mr. Eastman said, "In no other country of the world are steamships given free use of terminals. On the contrary, they are obliged to pay substantial sums for their use. Generally speaking, the coastwise and intercoastal lines in this country also pay, in one way or another, largely by owning or leasing their terminals, so that the benefits of the free use go mainly to the overseas lines." Mr. Eastman pointed out that the railroads were not the only ones who granted such free dockage, that private interests do it, getting their income from handling or wharfage charges, while railroads assess the cost against their general operations.

As exceptions to the practice, Mr. Eastman cited the case of New York City where the overseas steamship companies pay substantial rentals for their terminals, also the state docks at New Orleans and the terminals at Galveston where substantial dockage charges are assessed, and the Pacific Coast ports where lesser charges are assessed. From this he concludes that the granting of free dockage is not essential to the maintenance of business. Consequently he has had his staff prepare a set of minimum dockage charges which he can, if necessary, require the railroads to put into effect. However, as he knows that the railroads will be opposed to putting them into effect if their competitors still grant free dockage, he appealed to the Association of Port Authorities for its assistance in getting the principle of making such charges generally adopted.

At the Tuesday session, Rear Admiral Yates Sterling, Jr., commandant of the Third Naval District, voiced the Navy Department's opposition to the construction of bridges in the Hudson River below the George Washington bridge, also its objection to a bridge over the Narrows. He stated that the Navy Department considered the location of one of the piers of the new Triborough bridge as unfortunate in that it would become a restrictive element in the projected enlargement of the Hell Gate channel. Admiral Sterling expressed approval of the projected canal across New Jersey, linking the Delaware river and Raritan Bay.

J. Russell Wait, Houston, Texas, was elected president of the association to succeed Billings Wilson, New York.

Construction Code Authority Approves Two More Explanations

THE executive committee of the Construction Code Authority has approved two more explanations of competitive bidding practices under Article VII of Chapter I. Explanation No. 32 throws light on the question of what constitutes "an unnecessary number of bids" and "an unreasonable number of bids" as these phrases appear in Section 3 (a). The Code Authority explains that there is no authority under the Code whereby it may place a specific limitation on the number of bids to be invited, and whether an unreasonable number of bids has been invited depends upon the facts involved in each particular case. In drafting the code, cognizance was taken of the economic waste resulting from the expense of estimating by an unnecessary number of bidders, but it was deemed impracticable to define a maximum number of bids conforming to the varying conditions throughout the country, or the many different types of construction work embraced under the code. While the present provisions of the code call attention to this wasteful procedure and give encouragement to a reduction in the number of bids, the authority, similar to the drafters of the code, finds it impracticable to indicate a maximum number of bids fitting all cases.

Explanation No. 33 covers a highly important aspect of bidding, particularly as it affects the submission of sub-bids to a general contractor. The request and explanation grew out of a case where a special contractor found it necessary to modify his bid prior to the closing time and it was necessary to do this by telegram because of the shortness of time. The question raised, accordingly, was whether a modification by telegram was acceptable under the provisions of Section 7 of Article VII. The code authority explains that a telegraphic bid, as well as hand delivery, is recognized as a legal bid or modification, provided all other conditions for submitting bids are complied with. Specifically Section 7 requires that all bids shall be signed by a duly authorized representative of the bidder and enclosed in a sealed envelope on the outside of which shall appear its identification as a bid for the particular job.

The Construction Code Authority has also asked NRA to issue an official interpretation of the code to determine the latest time at which bids from subcontractors may be received by general contractors, where the general contractors' bids on the project are to be submitted on Monday or the day following a holiday. The code provides that bids from subcontractors shall be in the physical possession of the general contractor not less than 24 hours prior to the time the general contractor's bids are due with the awarding authority. Considerable confusion has existed as to whether such subbids may be submitted in such cases quoted on a Sunday or a holiday.

SOCIETY CALENDAR

NATIONAL COUNCIL OF STATE BOARDS OF ENGINEERING EXAMINERS, annual meeting, Portland, Ore., Oct. 3-5.

NATIONAL SAFETY COUNCIL, annual meeting, Cleveland, Ohio, Oct. 1-5.

AMERICAN WELDING SOCIETY, fourteenth fall meeting, New York City, Oct. 1-5.

INTERNATIONAL CITY MANAGERS ASSOCIATION, annual conference, St. Louis, Oct. 15-17.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, annual convention, Santa Fe, N. Mex., Nov. 12-15.

CANADIAN INSTITUTE ON SEWAGE AND SANITATION, first annual meeting, Toronto, Oct. 18-19.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, twelfth annual convention, Chicago, Oct. 24-26.

HIGHWAY RESEARCH BOARD, annual meeting, Washington, D. C., Dec. 6-7.

AMERICAN ROAD BUILDERS, annual convention, Washington, D. C., Jan. 22-25.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, fall meeting, Buffalo, Oct. 11-12.

MISSOURI WATER AND SEWERAGE CONFERENCE, tenth annual meeting, Carthage, Mo., Oct. 15-16.

NEW YORK STATE SEWAGE WORKS ASSOCIATION, fall meeting, Oneonta, Oct. 5-6.

NEW ENGLAND BUILDING OFFICIALS CONFERENCE, semi-annual meeting, Hartford, Conn., Oct. 23.

Personals

C. J. HERBOLD is inspector of sheet piling operations on the Fort Peck dam project.

ARTHUR J. STEAD, of Laguna Beach, Calif., has been appointed city engineer of that town. The office has been vacant for a year.

WILLIAM J. FOX, chief engineer of the Los Angeles County Regional Planning Commission, has been appointed a director of the commission.

HENRY G. PERRING, formerly supervising engineer of the Baltimore Public Improvement Commission, has been named chairman of the Baltimore Better Housing Committee, which is conducting the home modernization campaign in that city.

JOHN P. H. PERRY, vice-president of Turner Construction Co., has accepted

appointment as deputy director of the Emergency Works Bureau, City of New York, to assist in the construction operations on made-work projects. The work involves expenditure of nearly $10,000,000 per month.

THOMAS F. SULLIVAN has been appointed ERA administrator for Boston, succeeding Roswell G. Hall who has resigned to devote his entire time to the superintendency of public buildings in that city. Mr. Sullivan was chairman of the Boston Transit department and formerly served as commissioner of public works for that city.

Obituary

T. A. TURNBULL, contractor and founder of the firm of T. A. Turnbull & Sons, Vancouver, B. C., died in that city Sept. 15 at the age of 65.

GEORGE H. SCRANTON, general manager of the Birmingham Water Co., Derby, Conn., died Sept. 16 at his summer home in Preston, Ont., at the age of 73.

HOWARD L. ROGERS, for many years vice-president of the Stone & Webster Engineering Corp., Boston, Mass., died at his home in Chestnut Hill on Sept. 20. He was educated at M.I.T. and was with Stone & Webster from 1893 to 1929 in engineering and executive capacities.

WALTER W. MYERS, engineer and general superintendent of the Rock Asphalt Construction Co., died at his home in Buffalo, N. Y., Sept. 21 at the age of 67. He was a graduate of New York University and had worked on railway and highway projects before joining the Rock Asphalt Company in 1910.

MAURICE HOEFFKEN, highway contractor and president of Hoeffken Brothers Supply & Construction Co., Belleville, Ill., died Sept. 15 in St. Louis at the age of 64. He was active in Midwest construction work for more than 40 years.

EDWARD CHARLES MURPHY, hydrographer and engineer of the United States Geological Survey from 1895 to 1927, died in a California sanitarium Sept. 18 at the age of 75. Born in Canada, he graduated from Cornell University in 1884 and received a Ph.D. degree in 1900. Aside from some early years of teaching he spent his professional career with the U.S.G.S. In addition to research work on current meter accuracy he was interested in the movement of debris by ocean currents and rivers. He worked on several special assignments in the study of water supplies for power and irrigation. When he retired from the Water Resources Branch of the U. S. Geological Survey in 1927 he was the first engineer of that branch to be so retired. He had lived in California since his retirement.

CONSTRUCTION STATISTICS OF THE WEEK

ENGINEERING awards at $26,605,000 this week, while 5 per cent below last week, are 9 per cent above the average week this year to date. Public works is higher, $7,012,000 for federal awards and $17,044,000 for state and municipal. Private awards dropped this week to $2,549,000, 84 per cent below the average week to date.

Highway awards continue strong at $8,176,000; bridges are up at $2,766,000; public buildings, at $5,539,000; earthwork, irrigation, drainage and waterways, at $3,949,000; waterworks at $1,416,000; commercial buildings at $1,175,000. Lower awards are recorded in sewerage at $1,035,000 and industrial buildings at $975,000.

The larger lettings include: high school, Hamden, Conn., $630,000; 48 stores at Bronx Market by New York City Department of Markets, $771,000; extending Internal Revenue Building, Washington, D. C., $1,213,000; highway awards by Missouri $722,000, New Mexico $849,000, Texas $890,000, Iowa $719,000, West Virginia $644,000; New Westminster, B. C., Canada, bridge over Fraser River for Fraser River Bridge Co., Ltd., $3,500,000; dredging St. Clair River, U. S. Corps of Engineers, Detroit, $529,000; Pine View Dam near Ogden, Utah, by Bureau of Reclamation, $678,000; levee work in Atchafalaya Basin, La., by U. S. Corps of Engineers, $1,121,000; and railroad grading by U. S. Corps of Engineers, for Oregon-Washington Railroad and Navigation Co., $846,000.

Net increases in new capital for the week include state and municipal bond sales $5,947,000 and PWA non-federal allotments $4,881,000.

CONTRACTS
(Thousands of Dollars)

	Sept. 1933	Weekly Average Week Prev. 4 Weeks	Sept. 27 1934
Federal Government	$6,020	$6,320	$7,012
State and municipal	12,413	13,638	17,044
Total public	$18,433	$19,958	$24,056
Total private	8,236	6,168	2,549
Week's total	$26,669	$26,126	$26,605
Cumulative to date: 1933	$676,738	1934	$952,528

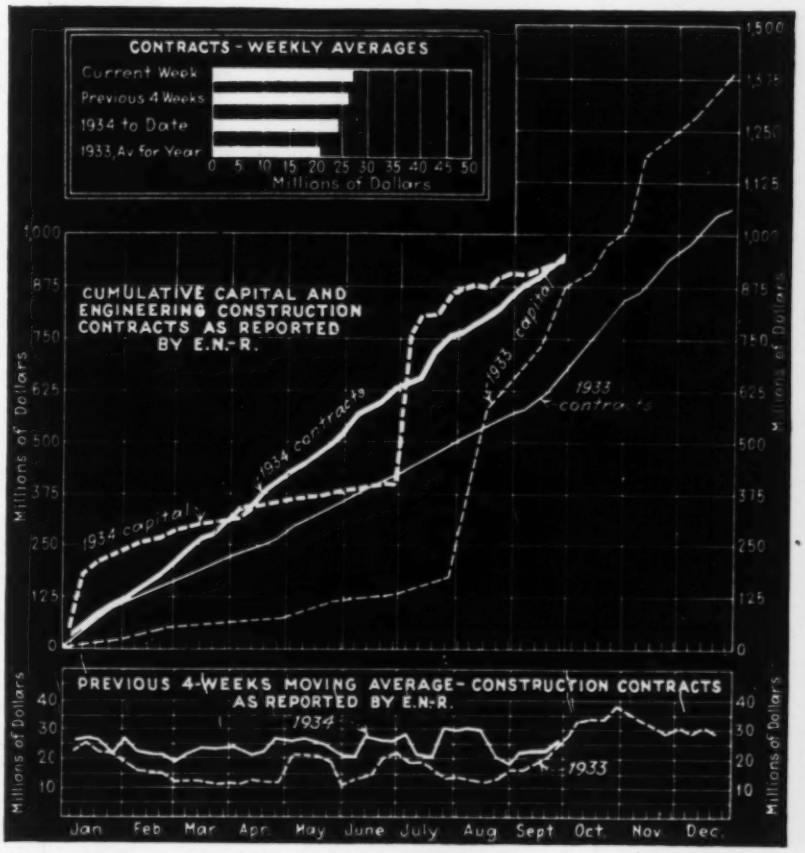
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1934	Week Sept. 27	Cumulative
State and municipal	$5,947	$254,286
PWA allotments, S&M	4,881	600,990
RFC loans, S&M	....	9,463
Corporate issues	....	18,081
PWA allotments, private	....	57,022
Total, Non-Federal	$10,828	$939,842
PWA allotments, Federal Constr.	4,188	192,611
Total new capital	$15,016	$1,132,453
Cumulative to date: 1933	$819,138	1934 $939,842

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for Federal construction.

INDEX NUMBER

E.N.-R.- Cost	1913 = 100	1926 = 100	E.N.-R.- Volume	1913 = 100	1926 = 100
Sept., 1934	200.58	96.41	Aug., 1934	94	42
Aug., 1934	198.40	95.37	July, 1934	128	56
Sept., 1933	175.48	84.35	Aug., 1933	73	32
1933 (Av.)	170.18	81.80	1933 (Av.)	102	45
1932 (Av.)	156.97	75.45	1932 (Av.)	127	56
1931 (Av.)	181.35	87.17	1931 (Av.)	220	96.5


CONTRACTS - WEEKLY AVERAGES
Current Week
Previous 4 Weeks
1934 to Date
1933, Av for Year
0 5 10 15 20 25 30 35 40 45 50
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1934 capital
1934 contracts
1933 capital
1933 contracts
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1934
1933
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Construction Equipment and Materials

Welding Head for Blowpipes Provides Auxiliary Flames

A new welding head for certain standard blowpipes, which provides in addition to the main welding flame two smaller auxiliary flames, has been introduced by the Linde Air Products Co., New York, N. Y. The new device is called the Multi-Flame Lindewelding Head.

It consists of a chromium plated stem and tip providing three flames, a main welding flame in the usual position and

Multi-Flame Lindewelding Head

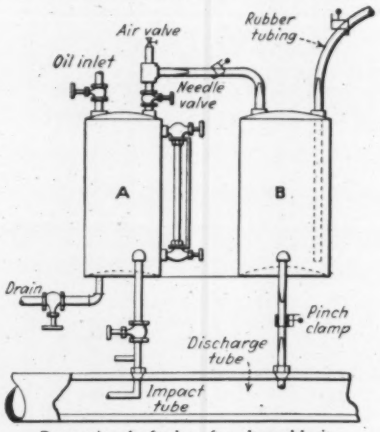
two smaller auxiliary flames so positioned as to preheat both edges of the V ahead of the advancing puddle.

The maker explains that the new and improved technique made possible by the multi-flame head is not greatly different from that previously recommended for single-flame welding, the distinctive features of which were backhand manipulation and an excess acetylene flame adjustment. The chief modification brought about by the new welding head is a lengthening of the stroke to insure even preheating of the V by the auxiliary flames and an even and more rapid compensatory melting of the welding rod.

Proportional Feeder for Chemicals Operates by Pilot Tube

New equipment for proportional feeding of hypochlorite or other corrosive solutions has been developed by D. W. Haering & Co., Chicago, Ill.

Referring to the accompanying illustration, compartment A is filled with oil. The needle valve control is placed at such a point that it is continuously filled with oil and consequently protected from the corrosive action of the solution. As the main fluid flows through the line a proportionate portion rises into compartment A, forcing the oil through the needle valve and into compartment B, displacing the reagent through a hard rubber pitot tube into the line. The machine is recharged by shutting off the connections from the pitot tubes and allowing the reagent to flow into compartment B, forcing the oil to return into compartment A while the main fluid which has risen into compartment A is drained and run into the sewer.



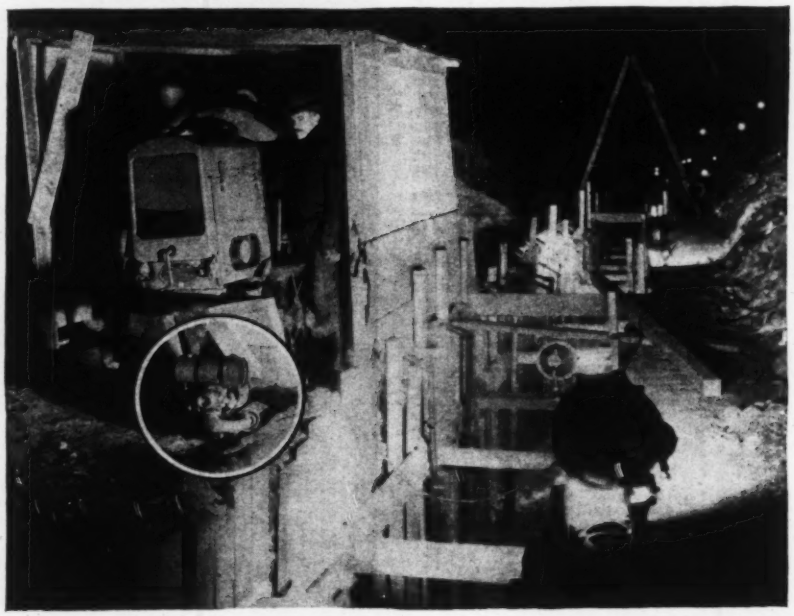
Proportional feeder for hypochlorite

The device will start, stop and vary in response to flow, and is protected from corrosion by the use of hard rubber connections and rubber lined tanks.

Portable Electric Generator To Operate Floodlights

The Homelite Corp., Port Chester, N. Y., announce a new portable 1,250-watt generator and floodlight to speed emergency repair work and to enable construction to continue after dark. The generator weighs 89 lb. complete with its built-in gasoline engine.

Homelite generator operating floodlights on construction job



It is claimed that the light weight and the compactness of this plant enable it to be stowed in an out-of-the-way corner of an automobile or truck.

The generator can also be used for operating electric saws, drills, hammers, sanders, paint spray guns and other electrically operated equipment.

New Publications

SPEED REDUCER CATALOG. Catalog No. 1415. 32 pages. Link-Belt Co., Chicago, Ill.

HOW TO SELECT INSULATED CABLE. 8½x11. 80 pages. General Electric Co., Schenectady, N. Y. Covers cable for the transmission and distribution of electric power.

TRANSITE CONDUIT FOR THE ELECTRICAL INDUSTRY. 8½x11. 15 pages. Johns Manville, New York, N. Y.

THE PROGRESS OF BRONZE WELDING. 8x10½. 8 pages. The Linde Air Products Co., New York, N. Y.

THE TESTING AND QUALIFICATIONS OF WELDERS. 6x9. 22 pages. The Linde Air Products Co., New York, N. Y.

UTILITY AIR HOIST. 8½x11. Bulletin No. 12,107. 32 pages. Ingersoll-Rand, Phillipsburg, N. J.

LUKENS CROMANSIL STEEL. 8½x11. 8 pages. Lukens Steel Co., Coatesville, Pa.

CATERPILLAR LEANING WHEEL BLADE GRADER. 8½x11. 32 pages. Caterpillar Tractor Co., Peoria, Ill.

MCKIERNAN-TERRY DOUBLE-ACTING PILE HAMMER. Bulletin 40A. 8½x11. 8 pages. McKiernan-Terry Corp., New York, N. Y. Heavy hammer for driving large piles.

FLEX-ARC CLETRAC WELDER. 8½x11. 4 pages. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

ROBINS GYREX SCREEN. Bulletin No. 90. 8½x11. 24 pages. Robins Conveying Belt Co., New York, N. Y.

LUBRICATED FOR LIFE. 8½x11. 8 pages. New Departure Mfg. Co., Bristol, Conn. Mine car bearings; conveyor roll bearings.

WATER SUPPLY AND WASTE DISPOSAL. 11½x17. 32 pages. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The use of electrical equipment in waterworks and sewage and refuse disposal.

TYPE R ROTARY SWITCHES. 8½x11. 8 pages. Roller-Smith Co., New York, N. Y.

DUAL DRUM PAVER. 8½x11. 20 pages. Ransome Concrete Machinery Co., Dunellen, N. J.

WATERPROOFING MASONRY STRUCTURES WITH SURFACE APPLIED MATERIALS. 8½x11. 8 pages. The Con-Tex Corporation, New York, N. Y.

THE STERLING DESTRUCTOR. Bulletin No. 71. 8½x11. 32 pages. C. O. Bartlett & Snow Co., Cleveland, Ohio. Refuse incinerators.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Arcata—City election Oct. 2, $90,000 general obligation bonds for purchase and improvement of water system now owned by P. Utilities California Corp. System will be purchased for $75,000 balance of issue for improvements.

Calif., San Francisco—City and San Francisco Co. plan raising O'Shaughnessy Dam 85 ft. in connection with Hetch Hetchy Municipal Water Project. $3,500,000. Plans approved by U. S. Rec. Dpt. N. A. Eckert, ch. engr., San Francisco Water Dpt., 425 Mason St., engr.

Conn., Willimantic—City making plans filtration plant in Natchaug River, refacing dam, removing Mud Island at pumping station and repairing reservoir Hosmer Mountain. $50,000 plus. P.E.R.A. project. N. S. Hill, Jr., 112 East 19th St., New York, engr.

Ia., Creston—City Council election soon $185,000 for purchasing local waterworks system of the Taxpayers Municipal Water Co. of Creston and improving the plant, if purchased by expending an additional $40,000 for deep well, pumps, main extensions, etc.

Massachusetts — Metropolitan Dist. Comn., Commonwealth of Massachusetts, W. E. Foss, dir. Water Div., 20 Somerset St., Boston, making preliminary plans 140x160 ft. rein.-con. underground reservoir, force mains and pumping station, 20 in. force main from pump house to reservoir, 2 m.g. daily capacity, in Belmont and Arlington.

Mont., Nashua—City plans constructing water distribution system, incl. well, pump, steel tank on steel tower, 15 blocks 4- to 6-in. c.i. watermains, hydrants. $25,000 (not official). Applied for loan and grant now pending before P.W.A. E. Sandquist, Havre, and C. Farmer, Helena, engrs.

Nev., North Las Vegas—Town plans water system. $40,000. Will form town government and vote bonds to secure P.W.A. loan to finance construction of same.

N. Y., Brentwood—Municipality plans water plant and system. $52,000. T.E.R.A. project. Noted July 12.

N. Y., Buffalo—Erie R.R. Co., G. S. Fanning, ch. engr., Midland Bldg., Cleveland, O., and Lehigh Valley R.R., G. T. Hand, ch. engr., 143 Liberty St., New York, plan watermain changes and sewer diversions in connection with elimination of William and South Ogden Street Grade Crossings. $51,711. Public Serv. Comn. approved plans. Noted Sept. 6, under "Bridges and Grade Crossings."

N. Y., Jamestown—City Bd. P. Utilities, City Hall, authorized C. O. Johnson, supt., to draw plans for extending c.i. mains in various parts of city and Ellicott Twp. To exceed $20,000. **Maturity 1935.**

N. Y., New York—New York Central R.R. Co., W. J. Pfau, ch. engr., 466 Lexington Ave., plans 21x44 ft. water pumping station, West End Ave. and 59th St. $28,000 with equipment. Private plans.

Okla., Blackwell—Voted $100,000, 5 mi. pipe line and dam on Chikaskia River, C. A. Stoldt, Blackwell, engr. Noted Sept. 13.

Okla., Hinton—City returned unopened bids to have been opened Sept. 12, improving waterworks. $20,000. Bids reported to exceed money available. V. V. Long & Co., Colcord Bldg., Oklahoma City, engrs.

O., Holloway—Plans new water supply. H. A. Nunlist, 1011 Traction Bldg., Cincinnati, engr. State Bd. Health approved general plans.

Okla., Skiatook—City plans 62,000 ft. pipe line from Tulsa pumping station to here, also includes distribution system. $93,000. P.W.A. loan and grant approved. V. H. Cochrane, Wright Bldg., Tulsa, engr.

Okla., Tulsa—Election Nov. 6. $100,000, water, sewer and street improvements. M. C. Shibley, city engr. Noted Mar. 22.

Tex., Aransas Pass—City, c/o C. S. Bolton, mayor, election Oct. 8, $28,000 waterworks and sewer improvements, $37,000. P.W.A. project. L. B. Griffith, 404 Sherman Bldg., Corpus Christi, engr. Noted July 12.

Tex., Dawson—City, c/o W. W. Johnson, mayor, election Oct. 9, $42,000, waterworks extension, new reservoir, new pumps, supply mains and fire hydrants. A. F. Mitchell, Dawson, engr. P.W.A. project. Noted July 26.

Tex., Del Rio—Voted $62,000 to secure loan and grant from P.W.A. in sum of $78,000 of which $16,000 will be an outright grant, reconstructing San Felipe Water System.

Tex., Fredericksburg—City, c/o E. Krauskopf, mayor, soon takes bids waterworks system, incl. 63,350 ft. 4- to 10-in. pipe, 395 ft. 12 and 10 in. Class 150 and 5,580 ft. 2- to 8-in. c.i. pipe, 104 manholes, 19 cleanouts. $100,000. **P.W.A.** Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, H. R. F. Helland, Frost Bldg., San Antonio, engrs. Noted July 12.

Tex., Graford—City, c/o F. A. Jones, submitted application for P.W.A. loan and grant to finance waterworks improvements, incl. 50 ft. mason dam, 12 ft. high, on Keache Creek, meters, valves, 50,000 gal. overhead tank, pumps and pump station. $35,000. Hawley, Freese & Nichols, Capps Bldg., Fort Worth, engrs.

Tex., Lindale—City, M. H. York, mayor, soon takes bids waterworks, incl. 2,860 ft. 8 in. c.i. pipe, 18,900 ft. 4- to 6-in. copper pipe, 20 F.H., 6-8 in. G.V., 7-6 in., 14-2 G.V., two 250 g.p.m. centrifugal pump and motor, 50,000 gal. steel tank, 100 ft. steel tower, fire hydrants. $30,000. P.W.A. project. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engrs. Noted July 26.

Tex., Naples—City plans waterworks system, incl. distributing lines, pumping unit, probably tank and tower. $45,300. P.W.A. project. H. R. F. Helland, Frost Bldg., San Antonio, engr. Noted Aug. 9.

Utah, Kaysville—City voted $25,000, replacing wood distribution system and supply line with c.i. pipe. $58,000. Difference to be furnished under FERA as labor project. Caldwell & Richards, Templeton Bldg., Salt Lake City, engrs.

Wyo., Medicine Bow—City plans pipe line from Colorado wells to city distribution system. $49,300. E. K. Nelson, c/o city, engr. P.W.A. loan granted.

Man., Winnipeg—City Council voted $68,000 for waterworks extension. W. P. Brereton, city engr. Noted Aug. 9.

Ont., Cooksville—Municipality plans extensive watermain system. I. H. Pinchin, clk.

BIDS ASKED

Ill., Findlay—Oct. 19, by Bd. Village Trustees, H. D. Lutz, pres., waterworks. $50,000. P.W.A. project. Warren & Praag, Milliken Bldg., Decatur, engrs. Noted May 3.

Ill., Greenfield — Oct. 23, by City Council, G. N. Cole, mayor, waterworks. $79,000. Warren & Van Praag, Milliken Bldg., Decatur, engrs. Noted July 26.

Ill., Springfield—Oct. 1, by City, laying 16 in. main in Ash St. and 6 in. mains in Park Dr., Sangamon and Dorlan Aves.; 3rd and Union Sts. P.W.A. project. R. L. Whannel, ch. clk. City Water, Light & Power Dpt., City Hall. Noted Sept. 6.

Ind., Michigan — Oct. 2, by Bd. Trustees Water Dpt., 321 Franklin St., constructing 1,400 ft. 12 in. watermain to elevated tank, Div. G. P.W.A. project. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs. Noted Aug. 16.

Mich., Centreville—Oct. 9, by Village, C. P. Chester, village pres., waterworks system, incl. well, distributing system, 16,500 lin.ft. 4- to 8-in. pipe, pumps and elevated tank. A. Lenderink, Kalamazoo, consult. engr. Noted Sept. 21, 1933.

Minn., Byron—Oct. 5, by Village, W. Moody, clk., constructing waterworks system, incl. 6 and 8 in. mains, valves, hydrants, well, pump house, steel tank and tower. $20,000. P.W.A. project. Druar & Milinowski, 830 Globe Bldg., St. Paul, engrs.

Minn., Ely—Oct. 9, by City, A. O. Knutson, clk., remodeling pumping and water treatment plant of Water Dpt. P.W.A. project. Part of $74,000 project. E. H. Berg, Eveleth, engr.

Miss., Clinton—City bids about Oct. 1, deep well, 100,000 gal. pressure tank, power unit, power house and laying as much watermain as P.W.A. money will allow. P.W.A. allotted $24,000 loan and grant. Noted Aug. 2.

Mo., Memphis—Oct. 5, by H. S. Wagner, clk., two 150,000 gpd. filter units complete, 3 pumping units, building and 170 cu.yd. concrete work. $12,000. P.W.A. project. W. B. Rollins & Co., 339 Railway Exch. Bldg., Kansas City, engrs. Noted July 26.

For official proposal advertising see Searchlight Section

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Buildings:

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Commercial 125
Industrial 126

Federal Government projects are classified under heading denoting type of work and designated by symbol of †

◆

N. C., Carolina Beach—Oct. 12, by Town Comrs., N. L. Mintz, clk., 6th St., Wilmington, constructing waterworks system, 1 deep well, 1 deep well pump, pump house, 100,000 gal. tank on 100 ft. tower with proper foundations and distribution system, 10,300 ft. 6- to 10-in. c.i. Class C pipe, 18,000 ft. 2 in. galvanized or c.i. pipe, valves, valve boxes, hydrants, concrete founds. $50,000. J. L. Becton, Wilmington, engr. Noted Jan. 24.

Ore., Ontario—Oct. 17, by C. F. Trow, city recdr., municipal water filtration plant. P.E.A. funds.

R. I., Cranston—State, Dr. F. J. Farnell, chn. State Pub. Welfare Comn., State House, Providence, bids about Oct. 1, installing c.i. watermains at State Institution. $50,000. C. E. Blais, Howard, engr.

S. C., Blackville—Oct. 2, by Town Council, furnishing materials for construction of improvements to waterworks system (a) extension to water distribution system, incl. pipe lines, valves, hydrants, meters and reconnections to present lines (b) 1 deep well, 2 deep well pumps and 1 building for pump. $45,000. P.W.A. project. Ryan Eng. Co., Arcade Bldg., Columbia, engrs.

Tenn., Memphis—Oct. 5, by H. S. Waggoner, city clk., waterworks improvements, Sect. 1, building and concrete structures; Sect. 2, two 150,000 g.p.d. filter units complete incl. 3 pumping units. P.W.A. project. L. C. Pitkin, mayor. W. B. Rollins & Co., 339 Railway Exch. Bldg., Kansas City, Mo., engrs.

Tex., Fredericksburg—Oct. 11, by City, c/o Habenicht, clk., constructing waterworks system, incl. gravel wall wells, pumping equipment, elevated storage tank and water distribution system, installing fire hydrants. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engr. Noted Sept. 27.

Tex., Hearne—Oct. 12, by City, c/o W. H. Ely, mayor, constructing waterworks improvements. $25,000. P.W.A. project. J. W. Berchetta Engineers, Inc., 1200 Natl. Bank of Commerce Bldg., San Antonio, engrs. Noted Aug. 16.

Tex., Marshall—Oct. 9, by City, c/o N. Wells, secy., reservoir improvements, rein.-con. slab roof, piling. $23,000. P.W.A. project. W. C. Albright, city engr. Noted Sept. 20.

CONTRACTS AWARDED

Ark., Glenwood—Incorporated Town at office of J. C. Self, mayor, complete waterworks system, to G. C. McEachin, Little Rock, $44,372. **P.W.A.** Bids Sept. 5, awarded Sept. 5. Noted Aug. 30.

Calif., Porterville—F. M. Pfrimmer, city mgr., furnishing, installing turbine pump and electric wiring, switches for complete pumping unit Orange St. well, to Bradford Mchy. Co., 310 Garden St., $738 and $340 respectively; pump house, to R. W. Moore, Fresno, $875. Grand total $1,953. Bids Sept. 12, awarded Sept. 17.

Ill., Forest—Village Council, 50,000 gal. tank on tower, 30 in. gravel packed well with rotary pump, 3,400 ft. 8 in. and 2,000 ft. 4 in. watermains, 5 new fire hydrants, etc., to Cameron & Joyce, Keokuk, Ia., $26,269. **P.W.A.** Bids Sept. 17. Noted Sept. 6.

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†*Federal Government.*

Waterworks (Continued)

Ill., Percy—City waterworks and distribution system, to H. J. O'Brein, 152 North Central Ave., Chicago, $32,000. **P.W.A.** Bids Sept. 10. Noted Sept. 13.

Ind., Michigan City—Bd. P. Wks., constructing waterworks structures for filtration plant, Div. A, to Buesching & Hagerman, 402 East Superior St., Fort Wayne, $179,766***piping and filtration equipment, Div. B, to Roberts Filter Co., Darby, Pa., $94,430***100,000 gal. elevated steel wash tank, Div. C, and 500,000 gal. tank and distribution system, Div. F, to Chicago Bridge & Iron Co., 37 West Van Buren St., Chicago, Ill., $6,190 and $33,985 respectively. Grand total $314,371. **P.W.A.** Bids Aug. 20.

Ia., Duncombe—City, furnishing, erecting water tank and tower, to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, $6,017. P.W.A. allotted $6,300. **P.W.A.** Noted Aug. 2.

Ky., Danville — City, waterworks improvements, incl. 3¼ mi. 20 in. c.i. pipe, to Tevis & Ingram, Danville; constructing raw water pumping station, to Chas. E. Caunell, Co., Louisville. Est. $100,000. **P.W.A.** Noted Sept. 19.

Massachusetts—Salem and Beverly Water Supply Bd., City Hall, Salem, filtration plant, pumping station, chemical building, pipe lines, etc. at Wenham Lake, North Beverly. Work will start soon under F.E.R.A. Total cost will probably approximate $500,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, engrs. Noted Sept. 20.

N. Y., Bethany—Bd. Supervs. Genesee Co., 94,000 gal. steel standpipe for water supply improvement to McBride Boiler Wks., Batavia, $3,275***concrete found. for same to J. Lennon Sons' Co., Batavia, $747***7,600 gal. reservoir, to Brunnels & Heale, Pembroke, $705 ***laying 6,900 lin.ft. c.i. pipe, to A. T. Barone, Batavia, $6,529. Grand total $11,256. Est. $15,000. Noted Aug. 23.

Okla., Enid—City, 2 new dug wells, force main, etc., by F.E.R.A. labor, $35,000. City furnishes material. C. H. Rightmire, Enid, engr. Noted Aug. 2.

S. C., Spartanburg—Comrs. P. Wks., rein.-con. foundation for 1½ m.g. tank, to P. Gilmore, Airport Rd., $7,682. Bids Sept. 18. Noted Sept. 13.

Tenn., Ashland City—City, Mayor, water supply, incl. 13,402 ft. 2- to 8-in. c.i. watermains, 2 deep well pumps, 2 horizontal pumps all of 75 gpm., brick pumphouse, corrugated galvanized iron filter building, to M. & Q. Constr. Co., Hill Bldg., Nashville, $30,402; 100,000 gal. tank on 50 ft. tower, to Chattanooga Boiler & Tank Co., 1011 East Main St., Chattanooga, $5,796 complete erected less foundations by general contractor. **P.W.A.** Bids Sept. 14.

Tex., Weslaco—City, H. Ratliff, mayor, extension to present 11 mi. watermains, installing sewage disposal plant, tank, filter beds, etc., to Ulen Contg. Corp., 38 South Dearborn St., Chicago, Ill., $46,500. **P.W.A.** Bids Aug. 14. Noted July 26.

Wash., Chehalis—City Com., distribution system for waterworks, to Queen City Constr. Co., 603 18th Ave., $70,543***main pipe line, to J. Coluccio, 4354 Henderson St., Seattle, $33,338. **P.W.A.** Bids Aug. 15.

Ont., Burlington—Water Comn., supplying iron pipe in connection with new 2,100 ft. intake, to Gartshore Thompson Pipe & Fdry. Co., Stuart St., Hamilton; laying intake, to Russell Constr. Co., 501 Harbor Comn. Bldg., Toronto ***valves, to Crane, Ltd., 40 Wellington St., Hamilton. Noted Aug. 30.

Alaska, Skagway—City Council, new waterworks system, to Wright & Stock, Skagway, $38,238.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Conn., Middletown—City making plans South Interceptor Sewer extension from Wilcox-Crittenden Co., Sumner St. and follows Sumner Creek to Mill St. bridge. Pipe not purchased. To exceed $25,000. FERA project. Will be constructed following completion of sewer work, Newfield Heights and Farm Hill Dists.

Ind., Richmond—City, W. B. Harris, mayor, making plans and takes bids in October, sewage disposal plant and intercepting sewers. $500,000. C. Hurd, 1039 Architects Bldg., Indianapolis, engr. P.W.A. project. Noted Aug. 2.

Ia., Dubuque—City Council voted $28,000 for storm sewers.

Kan., McPherson—City soon takes bids 10 and 12 in. sewer extensions. $35,000. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs. Noted Apr. 26.

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Kan., Topeka—City plans to start soon rebuilding sewage disposal plant. $275,000. P.W.A. approved loan and grant. Chas. A. Haskins & Co., 517 Finance Bldg., Kansas City, Mo., engrs. Noted Mar. 22.

Mo., St. Louis—City, cancelled contract constructing Sect. C-3, Downtown Relief Sewerage system, because of unexpected substratum of quicksand. $35,000. P.W.A. project. Will readvertise. L. A. Pettus, City Hall, engr. Noted July 1, under "Contracts Awarded."

Mont., Havre—City may hold election $80,000 bonds for sewage disposal plant. W. White, city clk.

N. Y., Buffalo—See "Waterworks."

N. D., Lisbon—City plans sewage disposal plant. $30,000. W. B. Sandager, city aud.

O., Columbus—Franklin Co., Mifflin Twp., plans school sewage treatment plant. Ohio State Bd. Health approved P.W.A. project. E. G. Bradbury, Court House Annex, co. sanitary engr.

O., Sidney—City detailed plans completed for relief storm sewers. Ohio State Bd. Health approved P.W.A. project. C. A. Maurer Eng. Co., Sidney, engrs. Noted Jan. 4.

Tex., Fredericksburg—City, c/o E. Krauskopf, mayor, soon takes bids sanitary sewerage system, incl. disposal plant (contractor submit type), 6,000 lin. ft. 12 in. vitr. pipe for mains, $128,000. P.W.A. project. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls. H. R. F. Helland, Frost Bldg., San Antonio, engrs. Noted Dec. 21.

Tex., Lindale—City, M. H. York, mayor, soon takes bids sanitary sewers, incl. 24,155 ft. 4- to 8-in. vitr. or concrete pipe, 49 manholes, sewage disposal plant, $27,000. P.W.A. project. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engrs.

Tex., Port Lavaca—City, W. M. Carter, mayor, will start taking bids on Sept. 22, sanitary sewerage system and sewage treatment plant. $65,000. P.W.A. project. J. C. McVea, 1318 Kipling St., Houston, engr. Noted July 19.

Tex., Stanton—City, S. C. Houston, mayor, soon takes bids sanitary sewerage system, incl. 28,170 ft. 6- to 10-in. vitr. pipe, 4,030 ft. 6 in. c.i. pipe, 48 manholes, 250 g.p.m. sewage pumps, pump house, sewage disposal plant, etc. $33,744. P.W.A. project. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engrs. Noted July 19.

Wyo., Evanston—City plans constructing complete sewage disposal plant. $75,000. Black & Veatch, 701 Mutual Bldg., Kansas City, Mo., engrs.

BIDS ASKED

Conn., Simsbury—See "Contracts Awarded."

Ia., Dubuque—Oct. 8, by J. J. Shea, city clk., 3,720 ft. 12- to 24-in. vitr. tile, 20 brick manholes, 30 concrete catchbasins with c.i. cover, 20 cu.yd. A and 150 cu.yd. B concrete in place, 2,600 sq.ft. sidewalks, 25 concrete catch basins, standard c.i. top with 4 in. lip, 15 catch basins, concrete with concrete top with manhole ring and cover. $28,000. W. H. Cullen, city engr.

Ia., Oskaloosa—City bids about Nov. 18, complete sewage disposal plant, equipment, piping and sewer connections. $150,000. D. R. Russell, city engr. L. Higgins, Jr., Des Moines, consult. engr. Noted Aug. 23.

Ky., Murray—Oct. 19, by City, sewerage system and sewage disposal plant. $65,000. P.W.A. project. J. N. Chester Engineers, Clark Bldg., Pittsburgh, Pa., engrs. Noted Sept. 14, 1933.

†**Md., Beltsville**—Oct. 10, by Dpt. Agriculture, Purchase, Sales & Traffic, Wash., D. C., furnishing, installing sewage treatment equipment at Beltsville Research Center.

Mass., Boston—Oct. 3, by City, Dpt. P. Wks., C. J. Carven, comr., City Hall Annex, concrete or vitr. clay sewer lines in Hyde Park Branch of Oakland Brook, Royal Rd., Ralston and Rutledge Rds., Hyde Park. To exceed $40,000. P.W.A. project.

Mass., Boston—Oct. 4, by City, J. P. Miller, comr. P. Wks., City Hall, furnishing 4,396 ft. 8 in. and 234 ft. 6 in. vitr. clay pipe, 60 pcs. 8x4 in. and 2 pcs. 6x4 in. vitr. clay pipe wyes, 3,100 lb. asphaltic joint compound, 22 manhole frames and covers, 76 bbl. portland cement, 8,000 ft. B.M. 2x8 in. spruce plank and 2,000 ft. 4x6 in. B.M. spruce timber, in connection with construction of sewage treatment plant. Above materials to be used on work to be done by city on day labor basis. Metcalf & Eddy, 1300 Statler Bldg., engrs.

Mass., Braintree—See "Contracts Awarded."

Mass., Worcester—Oct. 5, by Superintendent of Sewers, constructing 2 rein.-con. tanks, brick pumphouse, pipe lines and filter beds. P.W.A. Project 7632. To exceed $25,000. Noted Aug. 16.

Mich., Bessemer—Oct. 3, by City, sewage treatment plant, Contr. A, general, Contr. B, mechanical and pumping equipment, Contr. glass enclosure for sludge beds. Suhr, Berman, Peterson & Suhr, 130 North Wells, Chicago, Ill., engrs. Noted Aug. 2.

N. Y., Napanoch—Oct. 9, by Dpt. Correction, State Office Bldg., Albany, water supply at Institution for Male Defective Delinquents, Ulster Co.

Ohio—See "Streets and Roads."

O., Columbus—Oct. 2, by W. J. Lucks, Service, constructing outlet conduit for sewage disposal plant, involving 10,200 cu.yd. excav., 2,700 cu.yd. Class A concrete, 273,000 lb. steel reinforcing, in connection with southside sewage disposal plant. $80,400. P.W.A. project. P. W. Maetzel, City Hall, engr.

Tex., Fairfield—City, c/o H. L. Williford, mayor, bids about Oct. 1, 6 mi. 10- to 18-in. vitr. clay mains. $50,000. H. B. McAllister, 915 Washington Ave., Waco, and H. R. F. Helland, San Antonio, engrs. Noted June 7 under "Waterworks."

Tex., Fredericksburg—Oct. 11, by City, c/o B. Habenicht, secy., sewer improvements, incl. 69,426 ft. 4- to 12-in. vitr. clay and 5,876 ft. 2- to 12-in. c.i. pipe, 2,000 cu.yd. excav., 6,980 lin.ft. trenching. **P.W.A.** Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engrs. Noted Sept. 27.

Tex., Marshall—Oct. 9, by City, N. Wells, secy., sewage treatment works, incl. screen, grit chamber, inlet channel, 2 story settling tank, Imhoff tanks, effluent chambers, dosing tank, sludge drying bed, grease and scum drying beds, disinfection tank, etc. $143,000. Montgomery & Ward, Harvey-Snider Bldg., Wichita Falls, engr. P.W.A. project. Noted Sept. 20.

Wis., Milwaukee—Oct. 4, by Sewerage Comn., constructing steel and concrete foundations for 2 blowers for sewage plant extension. P.W.A. project. J. L. Ferebee, ch. engr.

Alta., Calgary—See "Contracts Awarded."

CONTRACTS AWARDED

Ark., Glenwood—Incorporated Town at office of J. C. Self, mayor, complete sewerage system, to McEachin & McEachin, Inc., Southern Bldg., Little Rock, $24,255. Est. $32,000. **P.W.A.** Bids Sept. 5. Noted Aug. 30.

Conn., Simsbury — Tariffville Fire Dist., 100,000 gal. per day capacity sewage treatment plant, settling tank, dosing chamber, sludge digestion and sludge bed, $30,000. Owner Builds. F.E.R.A. labor. J. D. Williams, 99 West Main St., New Britain, engr.

Ill., Clinton—Bd. Trustees Clinton Sanitary Dist., constructing Div. A sewers, to Missouri Eng. & Contg. Co., 5841 Hamilton Ave., St. Louis, Mo., $63,658***Div. B pumps, etc., and Div. C treatment plant, to Adams Constr. Co., Chicago, $6,401 and $79,455 respectively. Grand total $149,514. **P.W.A.** Bids Aug. 22. Noted Aug. 2.

Kan., Holton—At office J. A. Pomeroy, city clk., Alternate A, complete disposal plant, straight aeration equipment and additional Item 3, sludge heating equipment, to Grundeman Constr. Co., Holton, $26,184 and $950 respectively. **P.W.A.** Bids Sept. 11, awarded Sept. 11. Noted July 19.

Me., Portland—City, constructing 1,285 lin. ft. 30- to 36-in. vitr. clay and brick sewer in Preble and Alder Sts., to Camillo Profenno Co., 488 Stevens Ave., $22,684. **P.W.A.** Bids Aug. 29.

Mass., Braintree—Town, Sewer Dpt., Town Hall, vitr. clay sewer lines in various streets, day labor. **P.W.A.** G. Brusseau, town engr. Soon takes bids on pipe, lumber, jute, sand, gravel, crushed stone, air compressor, concrete mixer, asphalt, road tar, and miscellaneous tools.

Mass., Canton—Commonwealth of Massachusetts, Trustees of Hospital School, 8,390 ft. 10- to 15-in. vitr. clay sewer and appurtenances at Massachusetts State School, to J. Williams, 8 Beechwood St., Dorchester, $37,373. **P.W.A.** Bids Aug. 28, awarded Sept. 14. Noted Aug. 23.

Mass., Cohasset—Town, N. Hurwitz, chn. Bd. Health, Town Hall, concrete, brick storm drains in James Brook, to S. Rotondi & Sons, 144 Franklin St., Stoneham, $24,566. **P.W.A.** Bids Sept. 5, awarded Sept. 17. Noted Aug. 30.

Mass., Worcester—City, J. H. Brooks, supt. Sewers, 20 East Worcester St., pumps in connection with activated sludge treatment plant, to Chain Belt Co., 1600 West Bruce St., Milwaukee, Wis., approximately $700; ventilating doors at filters, to Chapman Valve Mfg. Co., Indian Orchard, approximately $4,000. Bids Aug. 28, awarded Sept. 14.

Mo., Marshall—City, 2 sewage disposal plants, 1 outfall sewer, 1 lift station, 10,664 lin.ft. 10- to 21-in. vitr. clay pipe laid, twenty

†*Federal Government*

Sewerage, etc. (Continued)

6 in. wyes, 1,376 lin.ft. 4- to 20-in. c.i. pipe laid; 48 cu.yd. concrete pipe piers, and pipe encasement, 1 sewage disposal plant, separate sludge digestion type and 1 Imhoff tank type and lift station with two 50 g.p.m. pneumatic sewage ejector units, to P. McGlone, City Bank Bldg., Kansas City, $126,218. **P.W.A.** Bids Sept. 11. Noted Aug. 30.

Mo., Springfield—City, constructing sewer in Jordan Valley Drainage Dist., Bond Issue 20, incl. 17,430 cu.yd. earth and 150 cu.yd. rock excav., 1,380 cu.yd. concrete in open section, 3,520 cu.yd. concrete in covered section, 320,855 lb. steel reinforcing, 5,800 lb. miscellaneous castings, 1 box inlet, 125 ft. 30 in. rein.-con. pipe inlet connection, to M. E. Gillioz, Monett, $86,983. **P.W.A.** Bids Sept. 18. Noted Sept. 13.

O., Cincinnati—See "Streets and Roads."

O., Columbus—City, W. J. Lucks, dir. Service, constructing final settling tanks, involving 36,400 cu.yd. excav., 7,570 cu.yd. Class A, 1,000 cu.yd. Class B, and 400 cu.yd. Class C concrete, 1,327,500 lb. steel reinforcing bars, 10,900 lb. iron castings, 89,900 lb. miscellaneous iron, to Northeastern Constr. Co., 101 Park Ave., New York, $293,944. **P.W.A.** Bids Aug. 28. Noted Aug. 16.

O., Springfield—City, Sect. F, Contr. 12, Buck Creek Intercepting Sewer, 2,405 ft. 54 and 60 in. precast concrete pipe, to Connelly Bros., 2nd Natl. Bank Bldg., Cincinnati, $68,071. Est. $80,536. **P.W.A.** Owner furnishes pipe. Bids Sept. 6.

Pa., Mt. Lebanon—Mt. Lebanon Twp., storm sewers McFarland and Cochran Rds., etc., to M. O'Herron Co., 21st and McKean Sts., N.S. Pittsburgh, $36,968. Vegeler Ramsey Co., Bowman Bldg., Pittsburgh, engrs.

R. I., Warren—Town, Sewer Comn., H. A. Nichols, pres. Town Council, constructing vitr. clay sewer lines and ejector station, to D'Uva & Basile, Providence, $32,889. **P.W.A.** Bids Sept. 6, awarded Sept. 17. Noted Aug. 16.

Tex., Weslaco—See "Waterworks."

Wash., Seattle—Bd. P. Wks., supplying clay pipe for Unit 5 Henderson Street Sewer, to Gladding, McBean & Co., $7,029.

Wis., Janesville — City, sludge collecting equipment for sewage treatment plant, to Link Belt Co., Huntington Park and Nicetown Station, Phila., Pa., $5,765***mechanically cleaned bar screen, to Chain Belt Co., 1600 West Bruce St., Milwaukee, $1,720***sewage pumps, to Economy Pumping Mchy. Co., 3432 West 48th St., Chicago, Ill., $3,694***sludge pumps, to Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago, Ill., $1,150***screenings shredder, to Jeffery Mfg. Co., Columbus, O., $670***gasoline engine generator unit, to Worthington Pump & Mchy. Co., 400 West Madison St., Chicago, Ill., $3,789. Grand total $16,783. Bids Sept. 12.

Alta., Calgary—City, sewer to new barracks building, day labor, $43,409.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Calif., Patterson—Modesto Irrigation Dist., Modesto, plans temporary pile bridge over San Joaquin River at Las Palmas Ave., $20,000 to $25,000. Cost will be borne by Stanislaus County and Patterson Water Co.

Ind., English—State Hy. Comn., Indianapolis, plans new highway bridge, $35,000.

Iowa—State Hy. Comn., Ames, cancelled bids to have been opened Sept. 25, constructing bridges and culverts NRS-478-B, Audubon Co.; and on NRS-486-B, Taylor Co. Noted Sept. 20.

N. Y., Hudson—Boston & Albany R.R. Co., G. A. Kirley, ch. engr., South Sta., Boston, Mass., revised plans approved by Pub. Serv. Comn. for eliminating grade crossing. To exceed $25,000.

N. Y., Ithaca—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, plans eliminating School House and Burts Crossings, near Ithaca station, $163,000. Public Service Comn. has permitted the railroad to suspend work until Jan. 1, 1936.

N. Y., Utica—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, soon takes bids eliminating Barnes Ave. Grade Crossing, $350,000. Noted Aug. 2.

O., Cleveland—City plans concrete, steel bridge at East 9th St. $150,000. Application made to P.W.A. for funds. J. M. Heffelfinger, City Hall, bridge engr.

O., Napoleon—O. W. Merrell, dir. Hys., Columbus, announced arrangements had been completed for reconstruction of Detroit, Toledo & Ironton R.R. subway on State Route 110, in Napoleon as co-operative project between Hy. Dpt., village of Napoleon, Henry County and railroad. Est. about $85,000.

Pa., Rochester—Pennsylvania R.R., W. D. Wiggin, ch. engr. (Central Div.), Union Sta., Pittsburgh, submitted to Rochester Borough Council plans for elimination of grade crossing and instead of subway previously planned, build a ramp or upgrade roadway.

Texas—State Hy. Comn., J. Wood, chn., Austin, soon takes bids constructing Elm and Menzie Creek bridges and approaches, rein.-con., Hy. 151, Menard, Menard Co. $34,625. G. G. Wickline, Austin, bridge engr.

Texas—State Hy. Comn., J. Wood, chn., Austin, making plans constructing steel, concrete overpass (Texas & Pacific R.R.) on Hy. 15, Marshall, Harrison Co. G. G. Wickline, Austin, bridge engr.

Texas—State Hy. Comn., J. Wood, chn., Austin, making plans constructing 2 rein.-con. bridges and approaches over Frazier Canyon and Short Canyon, Hy. 17, Jeff Davis Co. J. G. Lott, El Paso, div. engr.

Ont., Owen Sound—Grey Co. Council, making plans new steel, concrete bridge at Leith, to replace present structure which has been declared unsafe, $25,000. R. C. McKnight, Court House, co. engr.

BIDS ASKED

Illinois—Oct. 4, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing substructure, furnishing, fabricating and delivering structural steel, installing and erecting steel for Rock River Bridge, North of Prophetstown, Sect. 16E-NRH 89 E, Whiteside Co.; substructure and superstructure overhead structure at Buggsville, Sect. 108VB-NRS 411A, Henderson Co.; two steel I-beam bridges on creosoted piles east of Big Creek toward Perks, Sect. 10B-NRS 283A, Pulaski Co. E. Lieberman, ch. hy. engr.

Kentucky—See "Streets and Roads."

Maine—See "Contracts Awarded."

Maryland—Oct. 2, by State Roads Comn., Baltimore, single 14 ft. span, iron plate arch bridge, 28 ft. roadway, over branch of Rock Creek on Capitol View-Jones Mill Rd., Contr. M-275-2-35 P.W.A., Montgomery Co.

Massachusetts—Oct. 10, by City of Boston, Dpt. P. Wks., C. J. Carven, comr., City Hall Annex, Boston, repairing and strengthening Chelsea, North Bridge and viaduct approach, over Mystic River, between Charlestown and Chelsea. Noted June 28.

Mass., Framingham—See "Contracts Awarded."

Mo., St. Louis — Oct. 16, by City, Bd. P. Wks., City Hall, constructing 802 ft. rein.-con. viaduct over Manchester Ave. and River Des Peres, and tracks of Missouri, Pacific & St. Louis, San Francisco Railroads, 60 ft. wide, at Hampton Ave. $360,000. P.W.A. project. W. C. E. Becker, city engr. Noted Sept. 13.

New Jersey—Oct. 1, by State Hy. Comn., Trenton, constructing bridge and approaches at crossing of Central Railroad of New Jersey and completing approaches at Delaware, Lackawanna & Western R.R., on Route 30, Sect. 8A, at Hampton, Hunterdon Co. A. L. Grover, ch. clk.

N. J., Picton Depot—Oct. 15, by Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, constructing steel concrete highway bridge over railroad tracks, incl. approaches, for eliminating Central Avenue Grade Crossing, Clark Twp.

New York—Oct. 4, by Triborough Bridge Authority, 111 8th Ave., New York, constructing Ward's Island Piers of Triborough Bridge connecting Manhattan, Bronx and Queens Boros, Contr. 26; grading Whitlock Ave. between Leggett and Hunts Point Aves., Bronx connection of Triborough Bridge.

New York—See "Streets and Roads."

Oregon—Oct. 1, by State Hy. Comn., Pub. Service Bldg., Portland, constructing 60 ft. steel span and two 19 ft. timber trestles over Burnt River, on Baker-Unity Hy., Malheur Co.; widening bridges on Albany Tangert Section, Pacific Hy., Lake and Oake Creek, Linn Co. R. W. Baldock, state hy. engr.

Oregon—Oct. 11, by State Hy. Comn., Pub. Service Bldg., Portland, 161 ft. rein.-con. viaduct, at North Bend, Coos Co.; 1 steel 50 ft. span 99 ft. pile trestle over Burnt River, on Oregon Trail, Baker Co.; 132 ft. rein.-con. viaduct, at 4th St., Multnomah Co. R. W. Baker, state hy. engr.

Pa., Mercer—F. P. Graham, engr. Mercer Co., Grove City, bids about Oct. 1, repairing, constructing 7 bridges in various parts of county, $150,000. P.W.A. funds allotted.

Tex., Brownsville — Gateway Bridge Co., Brownsville, taking bids furnishing 112 tons steel sheet piling for bridge rebuilding. Floyd & Lochridge, Petroleum Tower Bldg., Dallas, and Brownsville, engrs. Noted Sept. 20.

†**Washington**—Oct. 18, by Bu. Reclamation, Almira, constructing Columbia River Highway Bridge, main span 550 ft. long and end spans each 200 ft., at Grand Coulee Dam, Columbia Basin Project, about 22 mi. northwest of here. R. F. Walter, Custom House, Denver, Colo., engr. in charge.

LOW BIDDERS

Nebraska and Iowa—Omaha Co. Bluffs, Missouri Bridge Bridge Bd. Trustees, constructing bridge, 2 river spans 471 ft. each with 4,000 ft. approaches on concrete piers over Missouri River between Omaha, Neb., and Council Bluffs, Ia., from Minneapolis Bridge Co., 701 Metropolitan Bldg., Minneapolis, Minn., $2,075,000. H. L. Cory, 503 Baum Bldg., Omaha, Neb., resident engr.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, bridges on 2.45 mi. NRS. 319-320, Washington Co., to Lamb & Dunson, Guntersville, $16,201***on 0.191 mi. hy, Hale and Marengo Counties, to G. A. Thomason, Greenwood, S. C., $26,359***on Sylacauga-Childersburg Rd., Talladega Co., to Way Constr. Co., Valdosta, Ga., $24,094***on Pratt City-Republic Rd., Jefferson Co., to A. J. Saley, Birmingham, $2,427*** on Pine Barren Creek, Leroy Rd., Washington Co., to Pettus Constr. Co., Montgomery, $39,765. Grand total $108,846. Bids Sept. 7.

†**Florida**—U. S. Engr., Jacksonville, constructing 6 drainage culverts on south and east side Lake Okeechobee, to Paul Smith Constr. Co., Haines City, $156,482. Bids Sept. 5. Noted Aug. 23.

Iowa—State Hy. Comn., Ames, bridges, culverts in Cass Co., to E. A. Wickham & Co., Council Bluffs, Ia., $23,177***4 concrete pipe and 2 box culverts and 122x24 ft. continuous I-beam bridge, Fayette Co., to Brennan Bros., Lansing, $11,332***bridge on same road, to Waugh & Tackman, Clarksville, $8,889***bridge same road, to Ward Constr. Co., Decorah, $27,509***plate girder bridge on same road, to A. R. Cuffeen, Decorah, $7,201***reflooring overhead crossing and rebuilding rail, Johnson Co., to A. Melberg, Cedar Rapids, $6,702***31 pipe and 14 box culverts, Marshall Co., to Christensen Bros., Sioux City, $18,678***2 concrete pipe and 7 box culverts and resurfacing pony truss bridge, Mitchell Co., to J. B. Elliott, Independence, $3,223. Grand total $106,531. **P.W.A.** Bids Sept. 12. Noted Sept. 6.

Maine—State Hy. Dpt., L. D. Barrows, ch. engr., Augusta, constructing Joshua Brook Bridge, Starks; Fish Stream Bridge, Patten; and Orr's Island Bridge, Harpswell; day labor under F.E.R.A. Est. $20,000-$25,000.

Md., Baltimore—Bd. Awards, steel, concrete bridge over Baltimore & Ohio R.R., on Edison Hy., to Frank Carrozz & Sons, 7 West 25th St., $49,792. Bids Sept. 12.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, steel superstructure of Point of Pines Bridge over Saugus River, between Lynn and Revere, to McClintic-Marshall Corp., Bethlehem, Pa., $540,907. **P.W.A.** Bids Sept. 11, awarded Sept. 15. Noted Aug. 30.

Mass., Framingham—Town, P. Wks. Dpt., one 60 ft. span, rein.-con. arch bridge, 40 ft. over Sudbury River, on Franklin St., day labor. Est. $40,000. S. Dyer, town engr. Contracts for materials except lumber have not been awarded.

Minnesota—State Hy. Dpt., St. Paul, Bridge 5385, State Project 30-82-21-1, NRS. 493-A, west of Amboy, Blue Earth Co., to Pedersen Bros., Montevideo, $37,951. **P.W.A.** Bids Sept. 7.

Missouri—State Hy. Dpt., Jefferson City, bridges over west fork Muddy Creek, over east fork Muddy Creek, and over Muddy Creek, all foregoing Jefferson Co., to F. T. O'Dell, Hannibal***over Prairie Creek, and over drainage ditch, both St. Charles Co.; culverts in Greene, Hickory Counties; bridge over Later Hill Creek, Carroll Co., to Lay Constr. Co., North Kansas City***3 underpasses under St. Louis, San Francisco R.R., west of Springfield; bridge over branch, both Greene Co., to Maxwell Constr. Co., Columbus, Kan.***bridges over Mill Race and over Spring Creek, LacLede Co., to L. G. Bareus, Kansas City, Kan.***over Carter Branch and over St. Louis, San Francisco and Missouri Pacific R.R., Jasper Co., over Wabash R.R. and Muncas Creek, Randolph Co., over Cunerty Branch, Gentry Co., to Brosmahan Bros., City Bank Bldg., Kansas City***bridge in Macon Co., to P. J. Murphy, Moberly***culverts, Shannon Co., to Trinidad Asphalt Mfg. Co., 600 South Teresa St., St. Louis***culverts and bridges, Shannon Co., to Carter Harlin Constr. Co., West Plains. Bids Sept. 7. Noted Aug. 30.

Neb., Lincoln—Sanitary Dist. 1 of Lancaster Co., three 100 ft. pony truss span bridge at North 27th St., to Bushman-Nelson Co., St. Joseph, $20,880. Est. $24,000. **P.W.A.** Bids Sept. 13. Noted Sept. 6.

Nevada—State Hy. Comn., Carson City, constructing overpass in Elko Co., to N. M. Ball, 1889 Yosmite Rd., Berkeley, Calif., $44,717. Bids Sept. 19.

New York—Triborough Bridge Authority, 111 8th Ave., New York, embankment Grand Central Parkway extension, 96th to Northern Blvd., Queens Connection to Triborough Bridge, connecting Manhattan, Bronx and Queens Boros., to Arundel Corp., foot Fulton St., Brooklyn, $898,000. Bids Sept. 13. Noted Aug. 23.

Pennsylvania — At office S. S. Lewis, secy. Hys., Harrisburg, 2 span 114 ft. arch stone faced bridge Route 201, Upper Merion and Schuylkill Twps., Montgomery and Chester Counties, to C. S. Moses, Edgewater Park, N. J., $18,243. Bids Sept. 14. 266 ft. rein.-con. bridge and rein.-con. pavement for ap-

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†*Federal Government.*

Bridges, etc. (Continued)

proaches, Route 242, Bridge 11, Canton Twp., Washington Co., to F. E. Trimpey & Sons, Caselman, $12,699. Bids Sept. 7. Noted Sept. 6 and Aug. 30 respectively.

Rhode Island—State Bd. P. Roads, Providence, rein.-con. viaduct and underpass, State Bridge 275 over Blackstone River, between Lincoln and Cumberland, to Frederick Snare Corp., 114 Liberty St., New York, substructure $131,242, superstructure $173,679. Bids Aug. 29, awarded Sept. 14. Noted Aug. 16.

Tenn., Nashville—S. H. McKay, city clk., 17 deck girder span viaduct, Demonbreun St., to Foster & Creighton Co., American Natl. Bank Bldg., $142,950. Est. about $192,950. **P.W.A.** Bids Sept. 18. Noted Aug. 23.

Texas—G. Gilchrist, state hy. engr., Austin, rein.-con. bridge Hy. 81, S.P. 919-F, San Saba Co., to L. D. Parks, 4108 Bunting St., Fort Worth, $13,016 est. $17,500•••Angelina River Bridge, and 2 relief bridges Hy. 110, S.P. 1009 G and H, Cherokee and Nacogdoches Counties, to Buckner Bros., Cleburne, $83,494 est. $80,000•••3 rein.-con. bridges Hy. 35, S.P. 273-B, Part 3, Nacogdoches Co., to Holland Page, Norwood Bldg., Austin, $24,459 est. $20,000, Grand total $120,969. Bids Sept. 10. Noted Sept. 6.

Washington—See "Streets and Roads."

Wisconsin—See "Street and Roads."

B. C., New Westminster—Fraser River Bridge Co., Ltd., 309 Royal Bank Bldg., Vancouver, new bridge over Fraser River, 200 ft. above present bridge, to Stuart Cameron & Co. Ltd., 675 West Hastings St., Vancouver, $3,500,000. Contractors now making sketches for same. Noted Feb. 8.

STREETS AND ROADS

BIDS ASKED

California—Oct. 11, by State Hy. Comn., State Bldg., Los Angeles, grading, bituminous treated crushed gravel or stone surfacing, 0.6 mi. approaches to Escondido Creek Bridge, San Diego Co. C. H. Purcell, P. Wks. Bldg., Sacramento, hy. engr.

Idaho—Oct. 5, by G. E. McKelvey, comr. P. Wks., Boise, constructing roadbed, drainage structures, graveling 5.28 mi. Malad Valley Hy. between Downey and Malad, in Oneida Co., incl. 800 cu.yd. solid rock, 63,000 cu.yd. common and 500 cu.yd. structure excav.; constructing 174 ft. concrete overhead structure over Great Northern R.R. and grading, surfacing approaches on 1.151 mi. North and South Hy., north of Colburn, in Bonner Co., 55,000 cu.yd. unclassified excav., 325 cu.yd. structure excav. for overhead and 45 cu.yd. structure excav. for culvert.

Illinois—Oct. 4, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, constructing approaches to subway east of Danville, SBI, Route 10, Sect. 38S-NRH 18-1, Vermilion Co.; approaches to Chicago, Burlington & Quincy overhead at Biggsville, SNI Route 94, 108VX-NRS, Project NRS 411A, Henderson Co.; 0.53 mi approaches to subway west of Armstrong, SNI Route 119, 114S NRH Project NRH 219-H; 0.31 mi. approaches SBI 119, Sect. 116S NRH Project 2191; 0.64 mi. connection at Indiana State Line, SBI Route 110, Sect. 116 NRH Project NRH 219G, all foregoing Vermilion Co.; 3.04 mi. Wayne County Line to North of Xenia, SNI Route SA6, Sect. 5G-NRS, Clay Co.; 3.79 mi. road east of Wheeler North, SNI-SA6A, Sect. 3G-NRS, NRS 413-A, Jasper Co.; 3.46 mi. SBI Route SA9 Sect. 12G NRS Project NRS 419A, Marion Co.; 4.65 mi. south of Petersburg, SBI Route SA4, NRS Project NRS 339A, Menard Co.; 3.75 mi. Sect. SI-G-NRS 352-B, Shelby Co.; 1.28 mi. Sect. 10A-NRS-283-A, Pulaski Co. E. Liberman, ch. hy. engr.

Iowa—State Hy. Comn., Ames, cancelled bids to have been opened Sept. 25, grading 1.924 mi. NRS-478-B, Audubon Co.; 4.056 mi. NRS-486-B, Taylor Co.; graveling NRS-462-AB, Adair Co.; and NRS 505, Iowa Co. Noted Sept. 20.

Kentucky — Oct. 5, by State Hy. Comrs., Frankfort, low type surfacing 6.922 mi. Lawrenceburg-Mt. Eden Rd., N.R.S. 335 AS (1935) Anderson Co.; 4.84 mi. Greensburg-Campbellsville Rd., N.R.H. 190 CS (1935) Green Co.; 7.843 mi. Edmonton-Columbia Rd., N.R.H. 238 AS (1935) Metcalfe Co.; 9.299 mi. Somerset-Russell Springs Rd., N.R.H. 211 DS (1935) Pulaski Co.; 3.737 mi. Russell Springs-Somerset Rd., N.R.H. 211 CS (1935); 3.762 mi. Russell Springs-Columbia Rd., N.R.H. 242 AS (1935) both Russell Co.; 5.378 mi. Stillwater-Hazel Green Rd., N.R.S. 334 AS (1935) Wolfe Co.; grading, draining 3.036 mi. Wickliffe-Lovelaceville Rd., N.R.S. 318 BG (1935) Ballard Co.; 1.887 mi. Burkesville-Tompkinsville Rd., N.R.S. 284 BG (1935) Cumberland Co.; 4.862 mi. Jonesville-Williamstown Rd., N.R.S. 301 BG (1935) Grant Co.; 3.115 mi. Raywick-Jackson Hy., N.R.S. 333 G (1935) Marion Co.; 1.136 mi. Tompkinsville-Burkesville Rd., N.R.S. 283 BG (1935) Monroe Co.; grading, draining, six 30 ft. and seven 30 ft. rein.-con. deck girders at Jonathon Creek, on Hardin-Eggners Ferry Rd., N.R.H. 265-A-BG (1935) Marshall Co.; 110 ft. steel superstructure for bridge over Clark's River, N.R.H. 265 AB, Marshall Co.; grading, draining medium type surfacing 1.638 mi. Harrodsburg-Lawrenceburg Rd., N.R.H. 160 DS (1935) Mercer Co.; high type surfacing 0.36 mi. Main St., Hopkinsville, N.R.M. 171 BS (1935) Christian Co.; 1.241 mi. Morganfield-Henderson Rd., N.R.H. 51 CS (1935) Henderson Co.; 1.173 mi. street in Cadiz, N.R.M. 11 CS (1935) Trigg Co.; medium type surfacing 3.185 mi. Providence-Sullivan Rd., N.R.H. 166 AS (1935) Webster Co.; steel superstructure for four 50 ft. I-beams, one 70 ft. through girder span bridge, Lynch-Cumberland Rd., N.R.S. 343 AB (1935) Harlan Co.

Kentucky—Oct. 19, by State Hy. Comn., Frankfort, low type surfacing 4.671 mi. Hardinsburg-McQuady Rd., 10.221 mi. Garfield-Vertrees Rd., both Breckinridge Co.; 3.89 mi. Fulton-Dukedom Rd. State Project 538, Fulton, Hickman and Graves Counties; 3.91 mi. Upton-Lucas Rd.; 5.296 mi. Garfield-Vertrees Rd., both Hardin Co.; 18.145 mi. Munfordville-Peonia Rd., Hart Co.; 6.022 mi. Columbus-Hailwell Rd., Flood Relief 97AS, Hickman Co.; 11.558 mi. Madisonville-Princton Rd.; 8.6 mi. Slaughters-Jewell City Rd., both Hopkins Co.; 6.024 mi. Smithland-Bayou Rd., Flood Relief 42 AS, Livingston Co.; 3.1 mi. Bardstown-Shepherdsville Rd., Nelson Co.; 2.898 mi. Campbellsville-Hodgenville Rd., Taylor Co.; grading, draining 4.4 mi. Ulvah-Blackey Rd., Flood Relief 36, Letcher Co.; 1.1 mi. Barbourvill-Manchester Rd., Knox Co. All foregoing State projects unless specified otherwise.

Louisiana — Oct. 16, by State Hy. Comn., Baton Rouge, grading, drainage structures 10.256 mi. Project 3301-A, N.R.S. 225, Route 168, between White Castle and Donaldsonville, Iberville and Ascension Parishes, involving 3,600 cu.yd. drainage and 6,887 cu.yd. roadway excav. and 140,841 cu.yd. borrow, etc. Former bids rejected.

Maryland—Oct. 2, by State Roads Comn., bituminous course, Spec. C, 1.5 mi. Contr. H-179-2-48. **P.W.A.** Harford Co.

Mass., Amesbury—Oct. 1, by Town, A. E. Webster, chn. Bd. Selectmen, Town Hall, bituminous macadam resurfacing 17,700 sq.yd. A. E. Rice, town engr., Main, Elm, Market and Friend Sts. To exceed $20,000.

Mass., Boston—Oct. 1, by City, P. Wks. Dpt., C. J. Carven, comr., City Hall Annex, sheet asphalt or bitulithic paving 1 mi. Old Colony Ave., Sect. B, Ward 7, from Dorchester to Mt. Vernon Sts. P.W.A. project.

Mass., Lynn—City, Ways & Drainage Comn., City Hall, rejected bids Sept. 17, sheet asphalt paving Broadway from Chestnut St. to Curtis Sq.

†Nevada—Oct. 9, by C. H. Sweetser, dist. engr., Pub. Rds., 461 Market St., San Francisco, Calif., grading, crushed graveling 12.216 mi. Midland Trail (Currant Creek) Natl. Forest Hy., White Pine and Nye Counties.

†New Mexico—P. Rds., Denver, Colo., rejected bids Sept. 10, base course oiling 12.934 mi. road in Bernalillo Co.

New York—Oct. 9, by A. W. Brandt, comr. State Hy. Dpt., Albany, preliminary grading 0.3 mi. Queens Co.; graveling 4.19 mi. Broome Co.; 3.97 mi. Lewis Co.; 1.79 mi. Schuyler Co.; and 125 ft. truss bridge Erie Co.; widening I-beam bridge Ontario Co.; concrete repaving 8.08 mi. Dutchess Co. and 24 ft. rigid frame bridge, Saratoga Co.

N. Y., Brooklyn—Oct. 3, by R. V. Ingersoll, pres. Brooklyn Boro. Boro Hall, grading, granite block repaving Division Ave.; asphalt on concrete repaving Avenue R, Buffalo, Division and Highlawn Aves., Bainbridge, East 33rd, East 46th, East 49th, East 53rd and East 56th Sts.; grading, curbing, flagging East 23rd, East 46th, East 53rd and East 92nd Sts.

N. Y., Long Island City—Oct. 3, by G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., grading, sheet asphalt on concrete paving Hillside Ave., Cross Island, Queens and Laurel Hill Blvds., 67th, 82nd and 122nd Sts.

N. Y., New York—Oct. 3, by J. J. Lyons, pres. Bronx Boro, County Bldg., Grand Concourse and 161st St., granite block surfacing St. Ann's Ave., East 152nd and East 167th Sts.; granite block and sheet asphalt on concrete paving Southern Blvd.; sheet asphalt on concrete repaving Southern Blvd., Jerome and Brook Aves.

N. Y., Oneonta—Oct. 2, by Commissioner Dpt. Health, State Office Bldg., Albany, constructing roads at State Tuberculosis Hospital, Otsego Co.

N. Y., Wingdale—Oct. 10, by Commissioner Dpt. Mental Hygiene, State Office Bldg., Albany, constructing roads and grading at Harlem Valley State Hospital, Dutchess Co.

Ohio—Oct. 6, by O. W. Merrell, dir. Hys., Columbus, brick on concrete paving 0.805 mi. Sect. "Columbus" (North High St. from Oakland Park Ave. to Dunedin Rd.) Columbus-Sandusky Rd., Franklin Co., $6,746; traffic bound macadam paving 1.735 mi. Sect. ... Millersburg-Dover Rd., Holmes Co., $43,851; ... removing present pavement, grading, lay... storm sewer, brick on concrete repaving 0.... mi. Sect. "Youngstown" (part of South A... Youngstown-East Liverpool Rd., Mahoning ... $86,899.

Ohio—Oct. 13, by O. W. Merrell, dir. H... Columbus, concrete paving 8.744 mi. S... "A", "D", "E" and "F", Dayton-Green... Rd., Darke and Miami Counties, $116,53...; tar macadam paving and construction 75 ... span concrete bridge with steel beams, S... "G" Defiance-Delphos Rd., Defiance Co., $94... •••brick paving incl. furnishing, delivering b... 1.424 mi. Sects. "I" and "P" (part) ... River Rd., Jefferson Co., est. $78,067; tar ... cadam paving 3.49 mi. Sect. "A" and "Maum... (part) Toledo-Waterville Rd., Lucas Co., $1... 154; bituminous macadam paving 2.73 ... Sect. "B" Dayton-Lebanon Rd., Montgomery ... $70,256.

O., Cleveland—Oct. 9, by City, improv... Cedar Point Rd. from Ruple to Greytown R... involving 19,951 cu.yd. earth excav., 10,8... sq.yd. stone, slag or gravel, 737 lin.ft. 12- to 18-in. V-S.P. or rein.-con. pipe, 3,064 lin.ft. ... to 18 V-S.P. (storm) 431 lin.ft. 8- to 24-... corrugated pipe, $31,000. J. O. M. Willia... Court House, engr.

†Oregon—Oct. 5, by Pub. Rds., Portland, constructing and improving 1.43 mi. Bu... Canyon Hy., Grant Co.; 1.5818 mi. Storm P... Hy., Chelan Co.; improving 7.137 mi. Republ... Kettle Falls Hy., Natl. Forest Rd., Perry ... W. H. Lynch, dist. engr.

Oregon—Oct. 11, by State Hy. Comn., Pub... Service Bldg., Portland, grading 5.36 mi. Idah... California Hy., Blue Mountain, Malheur ... 6.71 mi. Santiam Hy., Sheep Creek, Linn ... 2.28 mi. Old Oregon Trail Rd., Dixie, Bak... Co.; 3.43 mi. Central Oregon Hy., Nigger Fl... Harney Co.; 4.89 mi. Warm Springs Hy., Jefferson Co.; paving 1.427 mi. Swift Hy., Swift ... Multnomah Co.; 0.64 mi. Corvallis Newport Hy... Toledo, Lincoln Co.; surfacing John Day H... Kings Junction, Wheeler Co. R. W. Baldock... Salem, state hy. engr.

Pennsylvania—Oct. 5, at office S. S. Lewis... secy. Hys., Harrisburg, rein.-con. paving 1,160 ft. R-126, Abbottstown Boro, Adams Co., in... volving 911 cu.yd. Class 1 and 77 cu.yd. Class 2 excav.; 4,305 ft. R-247, Sect. 3, Pittsburgh, Allegheny Co., 21,106 cu.yd. Class 1, 3,859 cu.yd. Class 2 and 65,290 cu.yd. borrow excav.; 4,078 ft. R-281, Parallel, Sect. 3-A, Spurs B and C, Middletown Twp., Bucks Co., 5,244 cu.yd. Class 1, 88 cu.yd. Class 2 and 171,050 cu.yd. borrow excav.; 12,197 ft. R-35001, Sect. 1, Covington and Spring Brook Twps., Lackawanna Co., 93,113 cu.yd. Class 1, 1,170 cu.yd. Class 2, and 493 cu.yd. borrow excav.; 12,358 ft. R-496, Sect. 4, Girard and Springfield Twps., Erie Co., 5,495 cu.yd. Class 1, 1,397 cu.yd. Class 2, and 1,501 cu.yo. borrow excav.; rein.-con. paving bituminous surface Spec. E, 1,219 ft. R-136, Lancaster, Lancaster Co., 905 cu.yd. Class 1 excav.; rein.-con. paving, widening 2,76... ft. R-250, York City, North York Borough, West Manchester and Manchester Twps., York Co., 1,973 cu.yd. Class 1 and 226 cu.yd. Class 2 excav.; rein.-con. bridge, rein.-con. paving 60... ft. R-545, Bridge No. 19, Cecil Twp., Washington Co., 536 cu.yd. Class 1, 337 cu.yd. Class 2 and 1,978 cu.yd. borrow excav.; native stone or modified broken stone base with bituminous penetration surfacing 4,700 ft. R-236, Sect. 3, Hebron Twp., Potter Co., 8,269 cu.yd. Class 1 and 268 cu.yd. Class 2 excav.; dual type paving, consisting of two 10 ft. outside lanes, rein.-con. paved and 10 ft. bituminous surface Spec. E on native stone base course center lane, on 15,866 ft. R-8, Sect. 1, Milford and Westfall Twps., Pike Co., 34,766 cu.yd. Class 1, 3,636 cu.yd. Class 2 and 23,863 cu.yd. borrow excav.; widening existing pavement on each side with rein.-con. 2,184 ft. R-719, Sect. 2, Lower Merion Twp., Montgomery Co., 1,002 cu.yd. Class 1 excav.; bituminous penetration on native stone surfacing 22,050 ft. R-17041, Sect. 2, Pine and Huston Twps., Clearfield Co., 42,213 cu.yd. Class 1, 2,117 cu.yd. Class 2 and 2,232 cu.yd. borrow excav.

Pa., Sewickley—Oct. 2, by R. G. Woodside, controller Allegheny Co., Pittsburgh, sub-grade concrete culverts, sidewalks, curbing, rein.-con. paving 7,885 ft. Ohio River Rd. from Haysville to Sewickley, 40 ft. E. L. Schmidt, County Office Bldg., Pittsburgh, engr.

Wash., Seattle—Oct. 8, by Comrs. King Co., 20 ft. concrete paving 1.46 mi. west side of Lake Sammamish Rd. extension, incl. 7,530 cu.yd. excav. T. D. Hunt, co. engr.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, improving 2.701 mi. Goodwater-Kellyton Rd., Coosa Co., to Dunn Constr. Co., Inc., Lincoln Life Bldg., Birmingham, $49,091•••2.45 mi. N.R.S. 319-320, Washington Co., to T. M. Strider, Cotton States Bldg., Nashville, Tenn., $73,964•••concrete paving 0.056 mi. hy. in Tuskegee, Macon Co., to H. Lamar, Tuskegee, $1,782•••paving in Elba, Coffee Co., to Hardaway Contg. Co., $13,918. Grand total $138,755. Bids Aug. 30 and Sept. 7.

†*Federal Government*

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Streets and Roads (Continued)

†**Arizona**—Pub. Rds., Phoenix, seal coating roadway 17.199 mi. Sect. D, South Approach Road to Grand Canyon Natl. Park, Coconino Co., to Arizona Sand & Rock Co., Phoenix, $10,214. Bids Sept. 4.

†**Arizona**—Pub. Rds., Phoenix, crushed rock surfacing 4.1 mi. Sect. 2-B, Route 1, Petrified Forest Natl. Monument Rd., Apache Co., to R. C. Tanner & W. E. Hall Co., Phoenix, $15,812. Noted Aug. 30.

†**California**—P. Rds., 461 Market St., San Francisco, graveling 4.91 mi. Sect. B, of southwest approach to Lassen Volcanic Natl. Park, Lassen Natl. Forest, Tehama Co., to Tiffany Constr. Co., 535 North 7th St., San Jose, $25,097. Est. $29,103. Bids Sept. 13, awarded Sept. 17.

California—S. V. Cortelyou, dist. engr. State Hy. Comn., State Office Bldg., Los Angeles, grading, asphaltic concrete paving 0.3 mi. hy., approaches to Alhambra Wash Bridges, Los Angeles Co., to Kovacevich & Price, Inc., 5400 Imperial Hy., South Gate, $48,281. Bids Sept. 6, awarded Sept. 17.

Colorado—State Hy. Dpt., Denver, gravel surfacing 11.95 mi. hy. between Matheson and Limon on State Hy. 4, N.R.H. 79, (1935), Elbert Co., to C. Owen, 1375 Monaco Blvd., Denver, $100,166. **P.W.A.** Bids Sept. 5, awarded Sept. 16.

Connecticut—State Hy. Dpt., Hartford, J. A. Macdonald, state hy. comr., waterbound macadam paving 3,100 ft. Long Hill Rd., Andover, to Frank & Frank Constr. Co., Providence, R. I., $38,464. **P.W.A.** 12,423 ft. Bloomfield and Park Aves., Windsor **P.W.A.** and trap rock waterbound macadam paving 7,996 ft. Huckleberry Hill Rd., Avon, to Arborio Road Constr. Co., Inc., 2 Wolcott Ave., West Hartford, $39,893 and $37,978 respectively***storm sewer in Torrington Rd., Thomaston, to B. & R. Constr. Co., New Haven, $2,908***rolled bank run gravel surfacing 5,350 ft. Durham Rd., Killingworth, and 6,056 ft. Edgewood Rd. and Hart St., Berlin, to Joseph N. Rice, Inc., 902 Chapel St., New Haven, $10,275 and $7,827 respectively***2 in. Colprovia on 6 in. broken stone surfacing 1,526 ft. Chapel St., Derby, to Clark-Barone Co., 595 Legion Ave., New Haven, $12,913***loose gravel surfacing 9,225 ft. hy., Lisbon, to F. D. Miller, R.F.D. 6, Norwich, $17,929***8,984 ft. Country Club, Oxford and Allerton Farms Rds., Middlebury, to J. H. Adams, 72 Bridge St., New Milford, $6,839***19,742 ft. hy. Pomfret, to Bridge Constr. Corp., Hazardville, $19,270. Grand total $194,296. Bids Sept. 10. Noted Aug. 30.

Ill., Benton—Dpt. P. Wks. & Buildings, Div. Hys., improving 1.9886 mi. Sect. 11G-MFT, near Aiken, and 4.0787 mi. Sect. 17G-MFT, near Sesser, both 18 ft., Franklin Co., to Mautz & Oren, Inc., Effingham, $7,324 and $15,721 respectively***1.0167 mi. Sect. 10G-MFT, near Royalton, 18 ft., to W. H. Laird, Ewing, $4,093. Grand total $27,138. Bids Aug. 15.

Indiana—State Hy. Comn., Indianapolis, grading, crushed stone surfacing 4.711 mi. Jasper Co., to General Dredging Co., Fort Wayne, $42,984. Est. $59,691. Bids Aug. 21.

Ind., Indianapolis—City, widening and concrete resurfacing 560 ft. East 30th St., to J. N. Morgan & Son, 506 Inland Bldg., $8,157 est. $9,731***Vermont St., to Hoosier Constr. Co., 1201 East George St., $6,260***1,465 ft. West 30th St., and 525 ft. West 30th St., to D. Vogel, 1450 East 19th St., $14,618 and $3,554 respectively est. $17,886 and $4,352 respectively. Grand total $32,589.

Iowa—State Hy. Comn., Ames, to C. H. Kearns, Fairfield, concrete paving 0.58 mi. Jefferson Co. $19,346***to J. S. McLaughlin & Sons, 330 Liberty Bldg., Des Moines, 0.415 mi. Mitchell Co. $9,210; 6.54 mi. Mitchell Co. $163,582***to G. G. Herrick, 701 Corning Ave., Des Moines, 8.611 mi. Polk Co. $198,283; 4.023 mi. Polk Co. $92,332***to F. Moran Co., 2123 South 56th St., Omaha, Neb., grading 5.737 mi. Cass Co. $26,953***to Shirley Constr. Co., 306 South 24th St., Omaha, Neb., 2.044 mi. Fayette Co. $22,187***to Burch Constr. Co., Ottumwa, 7.49 mi. Marshall Co. $33,739***to Wahl Constr. Co., Victor, graveling 3.68 mi. Adams Co. $7,928; 5.513 mi. Adams and Union Counties $15,284***to A. R. Hewitt, Westgate, and Beu & Sons, Sumner, 12.279 mi. Bremer and Fayette Counties $17,905***to C. A. Emery, Coon Rapids, 6.064 mi. Cass Co. $14,349; 3.735 mi. Decatur Co. $7,440; 10.18 mi. Union Co. $14,974***to McManus Quarries Co., Keokuk, 8.682 mi. Des Moines Co. $12,589; 3.985 mi. Henry Co. $5,085***to C. J. Kipper, North Buena Vista, 6.136 mi. Dubuque Co. $8,470***to M. O. Weaver, Des Moines, 8.838 mi. same road $15,993***to Kelley Constr. Co., Des Moines, 4.007 mi. Jones Co. $9,318; 2.721 mi. Madison Co. $4,544; 4.053 mi. Pottawattamie Co. $7,308***to Baker & Paton, Cedar Rapids, 9.784 mi. Lee Co. $11,918. Grand total $718,737. **P.W.A.** Bids Sept. 12. Noted Sept. 20.

Ia., Cedar Falls—City, concrete paving 8,624 sq.yd. and brick paving 1,246 sq.yd., to McKenzie Bros., Waterloo. Est. about $26,000.

†*Federal Government.*

Maine—State Hy. Comn., L. D. Barrows, bituminous macadam paving 1.17 mi. Project N.R.H. 104-F, Camden and 1.8 mi. N.R.H. 145-C, New Limerick, to Bridge Constr. Co., Hazardville, Conn., $55,166 and $42,062 respectively***0.87 mi. N.R.H. 93-C, Bethel, to R. E. Bull, 151 Harrison Ave., Fitchburg, Mass., $43,368***0.32 mi. Project N.R.H. 134-B, Dover and Foxcroft, to J. R. Cianchette & Co., Pittsfield, $21,055***gravel surfacing 1.79 mi. N.R.H. 99-G, Whiting, to Lane Constr. Corp., 37 Colony St., Meriden, Conn., $47,428. Grand total $209,059. Bids Sept. 19.

†**Minn., Minneapolis**—Treas. Dpt. at office Sup. Archt., Wash., D. C., paving High St. and a new parapet wall on present retaining wall, to E. M. Ganley Co., 2922 Oakland Ave., Minneapolis, $15,090.

Missouri—State Hy. Dpt., Jefferson City, to Maxwell Constr. Co., Columbus, Kan., grading 2.072 mi. Greene Co. $85,632***to F. T. O'Dell, Hannibal, 4.396 mi. Jefferson Co. $27,021***to P. J. Murphy, Moberly, 3.125 mi. Bevier Rd., South, Route SC, Sect. 1, $6,343; 2.045 mi. same road, Sect. 2, $11,208***to Brosnahan Bros., City Bank Bldg., Kansas City, 4.521 mi. Gentry Co. $21,475; 1.838 mi. Randolph Co. $57,884; concrete paving 0.401 mi. Jasper Co. $67,859***to Kelly & Underwood, Granby, 0.414 mi. Montgomery City-Route 40 Rd., Route 19 NRH Sect. 103E1, $13,883; 0.939 mi. same road Sect. 103G $29,011; 2.55 mi. same road, Sect. 103A2 $80,075; 1.432 mi. same road, Sect. 103A3 $45,424; 2.487 mi. Sect. 103F, same road $84,750, all foregoing Montgomery Co.*** to Lay Constr. Co., North Kansas City, 0.435 mi. St. Charles-Alton Rd., St. Charles Co. $9,446; 1.197 mi. Carroll Co. $13,598***to Royce Zink, Appleton, graveling 3.489 mi. Coffey-Gallatin Rd., Sect. 67, $1,956; 3.989 mi. same road, Sect. 66 $2,235; 3.988 mi. same road, Sect. 65 $2,206; 2.31 mi. same road, Sect. 64, $2,448***to E. D. Reedy, Clay Center, Kan., oiling 43.8 mi. roads in Henry, Cass and Platte Counties, $9,907***to P. McGlone, City Bank Bldg., Kansas City, 0.477 mi. Jackson Co., $87,369***to J. Kesl & Sons, Edwardsville, Ill., 1.218 mi. Jefferson Co., $62,105. Grand total $721,835. Rejected bids Sept. 6 constructing roads in Holt and Henry counties. Bids Sept. 6. Noted Aug. 30.

Missouri—State Hy. Dpt., Jefferson City, concrete paving 0.139 mi. Marion Co., to Perry McGlone, City Bank Bldg., Kansas City, $28,020; 2.5 mi. Mississippi Co., to J. Kesl & Sons Co., Edwardsville, Ill., $44,870. Bids Sept. 6. Noted Aug. 30.

Nevada—State Hy. Comn., Carson City, constructing roads in Lyon and Nye Counties, to G. French, Jr., Box 107, Stockton, Calif., $22,405 and $53,782 respectively***Douglas Co., to Silver State Constr. Co., Fallon, $7,234***Lincoln Co., to O. Nelson, Logan, Utah, $32,812***Mineral Co., to Nevada Rock & Sand Co., 949 East 4th St., Reno, $65,685. Grand total $181,918. Bids Sept. 19.

New Hampshire—State Hy. Dpt., Concord, 6 in. one course rein.-con. on gravel paving 13,325 sq.yd. Daniel Webster Hy., Concord, Merrimack Co., involving 14,418 cu.yd. earth excav., to New Haven Road Constr. Corp., 1817 Dixwell Ave., New Haven, Conn., $47,670 est. $45,000; 2 in. premixed asphalt shoulders 1.49 mi. Daniel Webster Hy., Concord, Merrimack Co., 700 cu.yd. earth excav., to Winslow & Cummings, Nashua, $10,625 est. $18,000. **P.W.A.**

New Mexico—State Hy. Comn., Sante Fe, to Cook & Ransom, Ottawa, Kan., improving road in Bernalillo and Valencia Counties, **P.W.A.** $159,671; San Juan Co., $13,861; road in Harding and Colfax Counties $124,199; road in Socorro Co. $56,123***to New Mexico Constr. Co., Albuquerque, road in Bernalillo Co. $47,271; roads in Albuquerque Co. $23,730, both **P.W.A.***to Wheeler, Carrico & Silver, Albuquerque, road in Sandoval Co. $7,646***to E. W. Everly, Albuquerque, road in Tucumcari Co., $132,881, **P.W.A.***to Armstrong & Armstrong, Roswell, road in Union Co. $140,066, **P.W.A.***to Lee Moor Constr. Co., Bassett Tower, El Paso, Tex., road in Dona Ana Co. $47,891, **P.W.A.***to G. W. Orr, El Paso, Tex., road in Curry Co. $95,939, **P.W.A.** Grand total $849,278. Bids Sept. 14. Noted Sept. 6.

N. Y., St. George—J. A. Palma, pres. Richmond Boro, Boro Hall, asphalt block repaving Victory Blvd., to B. Turecamo Contg. Co., 1573 63rd St., Brooklyn, $61,666. Bids Aug. 29. Noted Aug. 23.

North Carolina—State Hy. & P. Wks., Raleigh, grading, topsoil and bituminous surface treating 7.28 mi. Halifax Co. and structures on 5.68 mi. Wilkes Co., to E. W. Grannis, Fayetteville, $35,553 and $16,819 respectively***bituminous concrete on concrete paving 0.97 mi. Guilford Co., to L. Ellis, Greensboro, $57,636***concrete widening 0.77 mi. Haywood Co. to J. S. Powers, Whiteville, $19,060***bituminous surface treating on crusher run stone base 0.72 mi. Transylvania Co., to R. B. Tyler & Co., 1446 Levering St., Louisville, Ky., $9,319*** grading, bituminous surface treating 5.3 mi. Scotland Co., to F. D. Cline, Raleigh, $34,265***structures on same road, to Gregory-Chandler Co., Virginia, Va., $11,528***grading, gravel surfacing 5.68 mi. Wilkes Co., to N. L. Teer, Durham, $50,956. Grand total $234,136. Bids Sept. 12.

North Dakota—State Hy. Comn., Bismarck, to Strom Constr. Co., Moorhead, Minn., grading 8.091 mi. Richland Co. $14,544***to Cosmos Constr. Co., Cosmos, 11.562 mi. Dickey Co. $13,821; 16.298 mi. Benson Co. $17,469***to Wilder & Wilder, Jamestown, 11.839 mi. Ransom Co. $14,572***to J. Coghlan, St. John, 9.448 mi. Cavalier Co. $16,156***to Studer & Manion Co., Bismarck, 3.912 mi. McIntosh Co. $7,757***to W. Collins, Fargo, 3.043 mi. Ransom Co. $6,457; 7.124 mi. Traill Co. $12,986; 4.055 mi. Walsh Co. $12,978; 5.518 mi. Benson Co. $13,890***to O. E. Miller, Bismarck, 4.385 mi. Morton Co. $15,994***to W. H. Noel Co., Jamestown, 7.102 mi. McLean Co. $18,638; 4.765 mi. Benson Co. $10,111; 7.567 mi. Sheridan Co. $22,648***to Rue Bros., Bismarck, 7.012 mi. McLean Co. $3,522***to Hall & Booth, Stanley, 4.099 mi. Divide Co. $13,312***to J. A. Jardine Co., Fargo, structures, etc., 8.091 mi. Richland Co. $4,594***to Beattie & Noggle, Bismarck, landscaping 0.56 mi. Kidder Co. $3,006***to Thomas Florist, Grand Forks, 0.345 mi. Walsh Co. $1,491***to Advance Constr. Co., Fargo, graveling 14.036 mi. Stutsman Co. $11,768; 11.122 mi. Walsh Co. $29,920***to Martin Joyce, Brandon, S. D., graveling, grading 5.511 mi. Stutsman Co. $6,621; 5.548 mi. Walsh Co. $8,468; 8.671 mi. Griggs Co. $16,048***to Huston & Mackely, Minot, structures on 4.099 mi. Divide Co. $4,559***to Hass Constr. Co., Minot, 3.385 mi. Sheridan Co. $7,920***to Jordon & Evolson, Hensel, 4.055 mi. Walsh Co. $4,661. Grand total $313,872. **P.W.A.** Bids Sept. 14. Noted Aug. 30.

North Dakota—State Hy. Comn., Bismarck, to Dickinson Ice & Transfer Co., Dickinson, graveling 0.206 mi. McKenzie Co. $1,559*** to Cosmos Constr. Co., Cosmos, Minn., 9.261 mi. Cavalier Co. $14,940; 5.237 mi. Nelson Co. $7,434***to B. Janssen, Stanton, 0.463 mi. Mercer Co. $5,889***to A. Vogts, Wahneton, 5.022 mi. Steele Co. $5,428***to Northwest Constr. Co., Bismarck, 11.6 mi. McIntosh Co. $10,960; 1.098 mi. Sheridan Co. $20,270; 1.471 mi. Mercer Co. $35,185; 2.322 mi. Mountrail Co. $39,895***to Summit Constr. Co., Summit, 1.86 mi. Barnes Co. $13,835***to Graham Asphalt Co., Bismarck, 1.624 mi. Burke and Ward Counties, $38,633***to Western Constr. Co., Williston, 0.151 mi. McKenzie Co. $9,395***to A. Graff & Co., Bismarck, 1.208 mi. Towner Co. $18,711***to Beattie & Noggle, Bismarck, 1.015 mi. Burleigh Co. $27,976. Grand total $250,110. Bids Sept. 14. Noted Aug. 30.

Ohio—O. W. Merrell, dir. Hys., Columbus, hot mixed asphaltic concrete paving 2.691 mi. Wilmington-Hillsboro Rd., Clinton Co., to C. O. Baldwin, Hillsboro, $93,296. Bids Sept. 7. Noted Aug. 30.

Ohio—O. W. Merrell, dir. Hys., Columbus, brick paving, incl. furnishing, delivering brick 0.863 mi. Cleveland-Canton Rd., Cuyahoga Co., to Cleveland Trinidad Paving Co., Terminal Bldg., Cleveland, $88,142; bituminous coated aggregate resurfacing 5.26 mi. Columbus-Chillicothe Rd., Franklin Co., to T. D. Van Camp, 55 East State St., Columbus, $26,757. Bids Sept. 14.

Ohio—O. W. Merrell, dir. Hys., Columbus, brick paving incl. furnishing, delivering brick 2.486 mi. Cuyahoga Falls-Kent Rd., Summit Co., to McCourt Constr. Co., 365 South Main St., Akron, $144,785***concrete paving, landscaping and part of same section 0.307 mi. Dayton-Troy Rd., Miami Co., to Davis-Hydaker Co., Spencerville, $21,123***grading, draining, concrete widening 2.449 mi. Mt. Gilead-Mansfield Rd., Richland Co., to S. Monroe & Son Co., 2040 Gallia St., Portsmouth, $32,633. Grand total $198,541. Bids Sept. 7. Noted Aug. 30.

O., Cincinnati—City, grading, draining, sewers, concrete paving 41,055 sq.yd. Montana Ave., to Middle West Roads Co., 4462 Colerain Ave., $223,777. **P.W.A.**

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. paving, concrete integral curbing, 2 rein.-con. structures 0.46 mi. Route 719, Sect. 1, Appl. 10, Lower Merion, Haverford, and Upper Darby Twps., also city of Phila., Delaware, Montgomery and Philadelphia Counties, to C. W. Good, 726 Columbia Ave., Lancaster, $104,317. **P.W.A.** Bids Sept. 14. rein.-con. paving, ditch and shoulder excavation 3.32 mi. Route 351, Sect. 2, Waterford Borough, Waterford Twp., Erie Co., to J. C. Devine Constr. Co., Masonic Bldg., Meadville, $120,732. Bids Aug. 14. Noted Aug. 2.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures 1.74 mi. State Hy. 66, S.P. 47 F and D, Bexar and Comal Counties, to Cage Bros., Bishop, $35,827 est. $40,000*** 15,711 mi. State Hy. 9, S.P. 954-B, Lynn Co., to Hannah & Hall, P. O. Box 994, Waco, $31,744 est. $40,000***5.204 mi. State Hy. 81, S.P. 919-F, San Saba Co., to Allbands & Davis, 501 Southwestern Life Bldg., Dallas, $38,950 est. $40,000***grading, drainage structures, con-

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Streets and Roads (Continued)

crete paving 9.08 mi. State Hy. 35, S.P. 273-B, Nacogdoches Co., to J. S. Moore & Sons, Lufkin, $143,290 est. $160,000***iron ore topsoil base course with road oil surface treating 15.325 mi. State Hy. 106, S.P. 697-C, Houston Co., to E. Loyd, Fort Worth, $173,558 est. $200,000*** crusher run broken stone base course and shoulders with hot-mixed limestone rock asphalt paving 25.129 mi. State Hy. 9, S.P. 1025 A and B and S.P. 528, Bexar and Kendall Counties, to Brown & Root, Inc., Colorado St., Austin, $418,974 est. $450,000 respectively***crushed gravel base course and single bituminous surface treating 8.034 mi. State Hy. 2, S.P. 28-B, Travis Co., to H. B. Zachary, Laredo, $47,871 est. $46,000. Grand total $890,194. Bids Sept. 10. Noted Sept. 6.

Tex., Waco—McLennan Co., W. C. Cobb, aud., grading, drainage structures 8.394 mi. road Unit 1, west of Waco, 20 ft., to F. Hall, P. O. Box 994, $57,951, est. $60,000; concrete paving 8.394 mi. road, Unit 2, 20 ft., to Russ Mitchell, Inc., Petroleum Bldg., Houston, $132,410 est. $135,000. Bids Sept. 4. Noted Aug. 23.

Utah—State Rd. Comn., Salt Lake City, natural rock asphalt paving 5.828 mi. road in Sanpete Co., to Christensen & Gardner, Interurban Depot Bldg., Salt Lake City, $28,875. Est. $38,000. **P.W.A.** Bids Sept. 14, awarded Sept. 14.

Utah—State Rd. Comn., Salt Lake City, natural rock asphalt surfacing 1.29 mi. road in Salt Lake Co., to Strong & Grant, Springville, $39,739. Est. $62,150. **P.W.A.**

Washington—State Hy. Dpt., Olympia, grading approaches to and constructing rein.-con. girder bridge on 0.363 mi. road in Yakima Co., to R. A. Geary, 102 North 26th Ave., Yakima, $16,997***grading, crushed stone surfacing 1.49 mi. Pacific Co., to Graham Bros. & Medley, 974 North St., Chehalis, $55,738***0.436 mi. Pierce Co., to L. Colluccio & Co., 1642 Lone St., Seattle, $16,494***8.875 mi. Kittitas Co., to F. G. Redmon, 503 South 5th Ave., Yakima, $34,809 ***concrete paving 0.054 mi. Kittitas Co., to Albertson & Cornell Bros., Inc., 1113½ A St., Tacoma, $229,565. Grand total $353,603. **P.W.A.** Bids Sept. 11.

West Virginia—State Rd. Comn., Charleston, to Gilbert Constr. Co., Beckley, improving roads in Fayette Co. $27,940***to Criss & Shaver, Parkersburg, in St. Albans, Kanawha Co. $16,979***to Triangle Eng. Corp., Wheeling, road in Wheeling $15,780; Highland Rd. $10,417; Union Rd. $9,447; Elm Grove $9,903, all foregoing Ohio Co.; roads in Brooke Co. $16,660*** to Allied Products Co., 9210 Holton St., Cleveland, O., Run Rd., Ohio Co. $7,484***to W. A. Wilson & Sons, St. Marys, Belmont Rd., Pleasants Co. $63,134***to Hatfield Constr. Co., Huntington, Raleigh Rd., Raleigh Co. $95,090; Fayette Co. $135,118***to R. Giavina, Huttonsville, road in Calhoun Co. $62,143***to Murphy Constr. Co., Morgantown, Mason Co. $44,964; Putnam Co. $19,670***to Southern Oil & Tar Co., Louisville, Ky., road in Wayne Co. $37,723 ***to E. C. Branham Constr. Co., Clarksburg, in Upshur Co. $19,977***to Southern Stone Corp., Roanoke, Va., road in Mingo Co. $45,804***to J. M. Francesa & Co., Fayetteville, Greenbriar Co. $5,769. Grand total $644,011. **P.W.A.** Bids Sept. 18. Noted Sept. 13.

Wisconsin—State Hy. and Douglas Co. Comn., Superior, to W. L. Kimmes, Superior, grading, draining 3.995 mi. County Trunk Hy. F, $15,731; 14.89 mi. Coolidge Memorial Hy., $41,528; constructing Nebagamon Creek Bridge, $3,497 ***to H. Maloney & Sons, Chippewa Falls, grading, draining 6.993 mi. County Trunk Hy. K, $17,667***to Wheeling Corrugating Co., 2547 Arthington St., Chicago, Ill., culvert pipe for County Trunk Hy C, $405***to Northern Supply & Fuel Co., Superior, culvert pipe for same road, Contr. 2, $1,548. Grand total $80,376. Bids Sept. 11. Rejected bids grading, draining 12.116 mi. Bardon Ave. Co. Trunk Hys. A and C. Noted Aug. 30.

Wisconsin—State Hy. Comn., Madison, concrete paving 3.516 mi. Milwaukee Co., to J. D. Bonness, Inc., 1627 North 48th St., Milwaukee, $171,302***1.342 mi. Racine Co., to J. R. Griffith Co., Racine, $44,557***2.821 mi. Dodge Co., to J. F. Bloomer, Appleton, $43,894*** stone, concrete structures in Milwaukee Co., to Bentley Constr. Co., 1828 West Pierce St., Milwaukee, $23,683. Grand total $283,436. **P.W.A.** Bids Sept. 14.

Wyoming—State Hy. Dpt., Cheyenne, grading, draining, bridges, surfacing 8.766 mi. road in Campbell Co., to J. J. Dooling, Denver, Colo., $62,737***draining, constructing dragline ditch, 4 treated timber bridges on 2.72 mi. Fremont Co., to R. Spatz, Cheyenne, $20,678***grading, draining, etc. 0.79 mi. in Laramie Co., to A. R. Read Co., Cheyenne, $38,236***grading, base course surfacing 5.528 mi. Park Co., to Taggart Constr. Co., Vody, $44,753***landscaping 0.298 mi. Laramie Co., to E. Vandehei, Cheyenne, $11,671***drainage ditch in Lincoln Co., to Swenson Lumber Co., Laramie, $1,915***4 bridges in Johnson Co., to Treaster & Peterson, Casper, $19,933***2 bridges and extending 2 culverts in Laramie and Goshen Counties, to Northern Constr. Co., Cheyenne, $9,161. Grand total $209,084. **P.W.A.** Bids Sept. 19. Noted Sept. 13.

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EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., Modesto — Modesto Irrigation Dist., election Oct. 9, $177,000 bonds to secure P.W.A. loan of $157,500 to finance canal lining and transmission line. P.W.A. allotted $67,500 grant.

Calif., San Jose—South Santa Clara Co. Water Conservation Dist. to be formed to finance construction of reservoirs and conduits to conserve flood water in area between Coyote and Gilroy. To exceed $150,000.

†N. Y., Clayton—U. S. Coast Guard, Wash., D. C., plans nearly ready for dredging, stone and concrete foundations and constructing 50 ft. lookout station on Gallows Island.

N. Y., Geneva—Ontario Co., Seneca Park Bd., W. A. Gracey, chn., plans filling behind breakwater at Seneca Park, incl. 28,000 cu.yd. fill, grading, etc. $17,500. T.E.R.A. project, funds allotted.

N. Y., Salamanca—City, F. Benz, mayor, plans dredging channel in Allegheny River. $17,500 or more. Will vote on bond issue soon.

Correction: Oregon — The Bonneville Dam project is under the jurisdiction of the U. S. Army Engineers, Portland, and all contracts have been awarded through the U. S. Engineers office. The reports stating that the Bureau of Reclamation awarded contracts for this project are incorrect.

BIDS ASKED

Ill., East St. Louis—Nov. 2, by Bd. Trustees East Side Levee & Sanitary Dist., S. H. Kernan, pres., 628A Missouri Ave., St. Louis, Mo., constructing diversion channel for Cahokia Creek into Mississippi River in vicinity of National Stockyards, incl. bridges and pumping station with equipment, etc., on Winter Ave. between 2nd and 3rd Sts. $2,360,000. P.W.A. project. E. F. Harper, ch. engr. Noted Sept. 27.

La., New Orleans—Oct. 15, by Bd. State Engineers, constructing Lake Borgne Canal Bank Protection Levee, 60,000 ft. long, 5½ to 6 ft. in height, on Paris Rd. in St. Bernard Parish, involving 250,000 cu.yd. material.

Maryland—Comrs. Anne Arundel Co., Court House, Annapolis, J. A. Bromley, engr., taking bids bulkhead, incl. 1,950 lin.ft. creosoted timber at Arundel on Bay; bulkhead, 738 lin.ft. masonry wall, 775 cu.yd. concrete, 2,694 lin.ft. creosoted timber at Bay Ridge. J. A. Bromley, Annapolis, engr.

†Minn., Winona—Oct. 3, by U. S. Eng., constructing 3.5 mi. earth and concrete dike at Lock and Dam 5A, in Mississippi River, near here.

Neb., North Platte—Oct. 5, by Platte Valley Power & Irrigation Dist., excavating 2,250,000 cu.yd. earth for outlet canal. D. D. Price, North Platte, engr.

N. Y., Buffalo — Oct. 4, by Dpt. P. Wks., City Hall, dredging Buffalo Inner Harbor for channel to completed contract depth for maintenance of channel from July 1, 1934, to June 30, 1935. G. J. Summers, comr.

†S. C., Charleston—Oct. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., breakwater at U. S. Quarantine Station.

Tex., Palacios—Oct. 1 to 10, by Palacios Seawall Comn., c/o G. A. Harrison, chn., seawall protection on following shoreline adjacent to cities of Palacios and College Port, concrete construction, gravity type, incl. 6,000 cu.yd. concrete, 11,000 ft. timber piles, 100,000 ft. timber tongue and groove treated sheet piles, 100,000 ft. untreated timber, 60,000 cu.yd. earth excav., 150,000 sta. yds. overhaul. Southwest Eng. Co., Littlefield Bldg., Austin and Palacios, engrs. Noted July 26.

Tex., Waxahachie—Ellis Co. Drainage Dist. 1, taking bids drainage work, incl. ditching and levees to protect from overflow and high waters, etc. $61,000. Funds just granted by R.F.C. Engineer, c/o Engineering Dpt., engr.

†Utah — Oct. 11, by Bureau Reclamation, Hyrum, constructing Hyrum Mendon Canal from Sta. 10 plus 50 to 731 plus 06; Hyrum Feeder Canal Sta. 4 plus 00 to 69 plus 49; Wellsville Canal Sta. 10 plus 62 to 284 plus 84, incl. 154,150 cu.yd. unclassified excav., for Hyrum Reclamation Project. R. F. Walter, Denver, Colo., ch. engr.

Que., Sorel—Oct. 4, by Secretary Dpt. P. Wks., Ottawa, Ont., wharf reconstruction, involving 1,200 cu.yd. rein.-con. for deck, 3,600 cu.yd. cribwork removal, 6,800 cu.yd. dredging, 869,182 lb. steel sheet piling, 6,275 lin.ft. rein.-con., 1,100 cu.yd. excavating, 17,200 cu.yd. filling, 370 cu.yd. gravel surfacing, $100,000. K. M. Cameron, Ottawa, Ont., engr.

CONTRACTS AWARDED

Conn., New Haven—City, Dpt. Parks, City Hall, rebuilding bulkhead at Quinnipiac Park to C. W. Blakeslee & Sons Co., 58 Waverly St., $14,000. Est. $18,000. Bids July 27, awarded Sept. 10.

†Ind., Indiana Harbor—U. S. Eng., Chicago, Ill., dredging 180,200 cu.yd. from Indiana Harbor Canal, to Great Lakes Dredge & Dock Co., 104 South Michigan Ave., Chicago, Ill., $84,69 Noted Bids Sept. 4. Noted Aug. 30.

†Iowa — U. S. Eng., Rock Island, Ill., excavation and disposal of materials from channel of Mississippi River, 6,600 ft. below Lock 19, at Keokuk and about 22 mi. upstream from Lock and Dam 20, to A. Johnson Constr. Co., 1411 Foshay Tower, Minneapolis, Minn., $109,340. Noted Aug. 23.

†Louisiana—U. S. Eng., P. O. Box 667, Vicksburg, Miss., 36,300 cu.yd. earthwork on east bank of Ouachita River, to Boone & Weste Inc., Monroe, 19.6c. per cu.yd. Noted Sept.

†Louisiana—U. S. Eng., New Orleans, 2,620,000 cu.yd. in Atchafalaya Basin, to Atlas Const Co., Tower Pet. Bldg., Dallas, Tex., $419,86 1,630,000 cu.yd. in same levee, to McWilliam Dredging Co., Canal Bank Bldg., New Orlean $700,900. Bids Sept. 4.

Maryland—Anne Arundel Co., Court House, Annapolis, 1,600 lin.ft. timber bulkhead, at Fairhaven, to Gordon Crandel, Chalk Point, $14,845. Bids Sept. 18. Noted Sept. 13.

†Mich., Detroit—U. S. Eng., dredging 979,547 cu.yd. from St. Clair River, to Dunbar & Sullivan Dredging Co., 2312 Buhl Bldg., $528,955. Noted Sept. 6.

†Mississippi—U. S. Eng., P. O. Box 667, Vicksburg, constructing 139,000 cu.yd. earthwork on left bank of Red River in Red River Levee Dist. 1, Arkansas, to Louisiana Materials Co., Inc., Southern Bldg., New Orleans, La., 9.2c. per cu.yd. Bids Sept. 14. Noted Sept. 6.

†Nebraska—U. S. Eng., Kansas City, Mo., 2,300 lin.ft. standard pile dikes and 5,250 lin.ft. revetment in Missouri River, at Decatur Bend, to Kansas City Bridge Co., 7th and Kaw Sts., Kansas City, Mo., $219,726. Bids Sept. 8. Noted Sept. 6.

Nebraska—Bd. Trustees Platte Valley Power & Irrigation Dist., North Platte, constructing diversion dam at Keystone, to Abel & Dobson, 1st Natl. Bank Bldg., Lincoln, $248,492. Bids Sept. 12. Noted Sept. 6.

Neb., Columbus—Loup River Public Power Dist., constructing 10 mi. power canal, involving 2,500,000 cu.yd. excav., to Haas, Doughty & Jones, Merchants Exch. Bldg., San Francisco, Calif., $152,843. Est. $300,000. **P.W.A.** Bids Sept. 19. Noted Sept. 20.

†N. Y., Dunkirk—U. S. Eng., Federal Bldg., Buffalo, N. Y., dredging 39,000 cu.yd. from Dunkirk Harbor, to American Constr. Co., Inc., Marion Bldg., Cleveland, O., $29,543. Bids Sept. 7. Noted Aug. 30.

N. Y., Hempstead—Hempstead Twp, dredging, improving waterways on South Shore, to W. H. Gahagen Co., 147 Remsen St., Brooklyn, $22,120. Bids Sept. 17, awarded Sept. 18.

†Ore., Astoria—Yards & Docks, Navy Dpt., Wash., D. C., repairing bulkheads and piers at Naval Submarine and Destroyer Base, Spec. 7766, to Makela Constr. Co., Astoria, $13,746. Noted Sept. 6.

†R. I., New Shoreham—U. S. Eng., Custom House, Providence, dredging at Block Island Sound, to Elliott & Watrous, Inc., 87 Globe St., Providence, $1,759. Bids Sept. 4, awarded Sept. 14. Noted Aug. 30.

†Tenn., Memphis—U. S. Eng., 1,230,000 cu.yd. levee work in White River Levee Dist., to C. W. Greeson, Baton Rouge, La., $205,902; 1,490,000 cu.yd. in White River Levee Dist., to Clarke Bros. Constr. Co., Clinton, Ia., $230,503. Bids Aug. 31. Noted Aug. 23.

†Texas—U. S. Eng., Galveston, dredging 1,780,000 cu.yd. in channel from Galveston Harbor to Texas City, to Standard Dredging Co., 80 Broad St., New York, $103,240. Bids Sept. 10. Noted Aug. 23.

†Texas—International Boundary Comn., El Paso, Tex., dredging 5 mi. channel near mouth of Arroyo Colorado, San Benito, Cameron Co., to Atlas Contg. Co., Petroleum Bldg., Dallas, $139,976. Bids Aug. 31. Noted Aug. 16.

Tex., Pecos—Red Bluff Water Power Control Dist., c/o R. M. Couch, pres., Pecos, constructing transmission lines at Red Bluff Water and Power Plant, to L. E. Myers, Allen Bldg., Dallas, $63,753; housing lines, to O'Brien & Marr, El Paso, $27,789. **P.W.A.** Noted Sept. 28, 1933, under "Texas."

†Utah—Bureau Reclamation, Custom House, Denver, Colo., constructing Pine View Dam and appurtenant works for Ogden River Project, near Ogden, to Utah Constr. Co. and Morrison Knudsen Co., Ogden, $677,898. Bids Sept. 5. Noted Mar. 15.

†Federal Government

Earthwork, etc. (Continued)

Vt., Burlington—See "Unclassified."

N. S., Lockport—Dpt. P. Wks., Ottawa, Ont., K. M. Cameron, engr., dredging in harbor, to Beacon Dredging Co. Ltd., Halifax. $14,667. Est. $18,300. Bids Aug. 31.

Ont., Rondeau—Secretary Dpt. P. Wks., Ottawa, pier reconstruction, to C. Warwick & Sons, Highgate, $16,566. Bids Aug. 9. Noted Aug. 7 Daily.

Que., Russian Leblanc — Secretary Dpt. P. Wks., Ottawa, Ont., dredging, to Cummins Constr. Co. Ltd., Montebello. $24,088. Est. $20,500.

UNCLASSIFIED

PROPOSED WORK

Calif., Chico — ELECTRIC DISTRIBUTING SYSTEM—Bidwell Municipal Utility Dist. (district to be formed) to finance purchase and improvement of system now owned by Pacific Gas & Electric Co., 245 Market St., San Francisco.

Calif., Redwood City — ELECTRICAL DISTRIBUTING SYSTEM—City plans purchasing electrical distributing system now owned by Pacific Gas & Electric Co., 245 Market St., San Francisco, and improve same and to operate as a municipal project. State Railroad Comn. has been requested to appraise the system.

Kan., McPherson—STREET LIGHTING SYSTEM—City, E. C. Crary, mayor, soon takes bids ornamental street lighting standard, etc., $25,000. L. C. Augevine, supt. City Light Plant.

Neb., Norfolk—DISTRIBUTION SYSTEM—See "Public Buildings."

N. Y., Brooklyn—RECREATION BUILDING—Dpt. Parks, Central Park, Arsenal Bldg., New York; plans by A. Embury, c/o owner, 1 story, 46x73 ft., brick recreation building, Avenue V and Stillwell Ave. $28,000.

N. Y., Brooklyn—UNDERGROUND STORAGE TANKS, etc.—Nelson Bros. Coal Co., 398 Hamilton Ave., bids in November or later, general and separate contracts underground storage tanks and bulk station, Smith and Creamer Sts. $35,000. M. T. Katz, 125 West 14th St., New York, archt. Noted Aug. 16.

N. Y., Jamestown—PIPE PLANT—Pennsylvania Gas Co., Warren, Pa., C. T. Sloan, vice-pres., plans 10 mi. gas line from Jamestown along east shore of Chautauqua Lake to Bemus. To exceed $17,750. **Maturity indefinite.**

N. Y., New York—COAL POCKETS—Sinram Bros., Inc., 415 East 37th St., plans coal pockets, Harlem River and East 138th St. To exceed $30,000. Site acquired. Architect not appointed.

N. Y., New York—RECREATION BUILDING, etc.—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, c/o owner, recreation building and comfort station, Baxter Park and Mulberry St. $28,000 or more.

N. Y., Rockaway Beach—SWIMMING POOL—Dpt. Parks, Central Park, Arsenal Bldg., New York, plans by A. Embury, c/o owner, swimming pool, Jacob Riis Park. $40,000 or more. **Maturity later.**

N. Y., Webster — DISTRIBUTION LINE — Rochester Gas & Electric Co., Rochester, plans electric distribution system here and in Monroe Co. To exceed $30,000.

N. C., Newbern—PRISON CAMP—State Hy. & Pub. Wks., Raleigh, plans new prison camp to replace old one. $25,000. W. L. Craven, Raleigh, bridge engr.

O., Cleveland—PLAYGROUND—City, c/o S. Newman, preparing plans playground improvements, incl. link fence, wading pool, concrete walks, water system and shelter house. Est. $25,000.

O., Columbus—RECREATION HALL—F.E.R.A. approved erection and equipment of recreation hall at Riverside Park, incl. construction of mess hall, 10 bunk houses and tennis and handball courts. $37,300.

Pa., Clarion—RADIO BROADCASTING STATION—Clarion Broadcasting Co., Inc., J. V. Ketley, pres., Clarion, plans radio broadcasting station, incl. 250-watt equipment for broadcasting on wave length of 850 kilocycles. $30,000 or more. Private plans. **Maturity in fall.**

Pa., Collingdale—CEMETERY DEVELOPMENT—Har-Zion Cemetery Co., plans cemetery development, incl. land development and chapel hall of memories. $100,000. W. L. Charr, 1001 Chestnut St., Phila., engr.

Pa., East Canonsburg—MINE SETTLEMENT IMPROVEMENT—Standard Tin Plate Co., recently acquired Philadelphia Patch Mine and settlement of Chartiers Creek Coal Co., and plans improvement program at settlement. $100,000. Private plans for time being.

†*Federal Government.*

Pa., Erie—VEHICULAR TUNNEL—Peninsula Park Comn. plans vehicular tunnel under grounds of Soldiers Memorial Home in Peninsula Park on Lake Erie. F. W. Talbott, engr., c/o Owners, authorized to make preliminary plans and specifications. **Maturity in 1935.**

Texas—OIL and GAS FIELDS—University of Texas, Austin, plans developing 11,520 acres oil and gas field, incl. test wells. **Maturity indefinite.** Humble Oil & Refining Co., Humble Bldg., Houston, lessee.

Tex., Dallas—CENTENNIAL—City of Dallas has been selected as site for Texas Centennial to be celebrated in 1936. This will require an expenditure of $20,000,000 and will require 95 acres of ground in addition to State Fair grounds on which the centennial will be located. This acquisition will require razing and removal of over 400 houses and business properties. Work is expected to start within 30 days.

Wyo., Gillette—PIPE LINE, etc.—H. P. Rothwell, Gillette, applied to State Public Utilities Comn. for certificate of convenience and necessity to construct 25 mi. pipe line and gas plant.

Alta., Calgary—AUDITORIUM, etc.—City Engineer preparing plans auditorium and gymnasium. $100,000.

B. C., Bonnington—TRANSMISSION LINE—Municipality plans new power transmission line from hydro-electric power plant here to city substation at Nelson. $35,000 will be expended under by-law.

Ont., Goderich — TELEPHONE SYSTEM — Bell Telephone Co. of Canada, Canada Permanent Bldg., Toronto, plans improving telephone system by installing new underground cable and new overhead lines. $30,000. Private plans.

Que., Montreal—AIRPORT—City plans airport on St. Helen's Island, suitable for hydro planes.

BIDS ASKED

New York—STATION and TUNNEL LIGHTING, etc.—Oct. 9, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing station and tunnel lighting equipment, incl. electric heating and toilet ventilation, for part Independent City-owned Rapid Transit Railroad System, between Bway.-Lafayette and York St. Stations, Manhattan and Brooklyn Boros; furnishing treated ties for use in Rapid Transit Railroads, Order 22, Manhattan Boro.

N. Y., Rensselaer—BULK STORAGE, etc.—See "Contracts Awarded."

N. Y., Syracuse—TANKS, etc.—See "Contracts Awarded."

†**T. H., Pearl Harbor**—HANGAR—Yards & Docks, Navy Dpt., Wash., D. C., taking bids seaplane hangar at Naval Fleet Air Base, Spec. 7770. (Date not set.)

CONTRACTS AWARDED

†**Calif., San Diego**—PLATFORM PLATES—Yards & Docks, Navy Dpt., Wash., D. C., replacing steel platform plates at tops of three 600 ft. radio towers, Naval Operating Base, Spec. 7738, to Acme Ornamental Iron Wks., 1452 J St., $2,478.

†**Calif., San Rafael**—TELEPHONE CABLE—Con. Q.M., constructing extension of underground telephone cable system at Hamilton Field, to W. Degen, 2055 Santa Clara St., Alameda. $1,931. Bids Sept. 5, awarded Sept. 14.

Connecticut — BROADCASTING STATION — American & Republican, Inc., 174 Grand St., general contract broadcasting station, incl. two 190 ft. steel towers and transmitting station, Waterbury and Prospect with studios in Waterbury, to W. J. Megin, Inc., 1 Elm St., Naugatuck. Noted Sept. 6.

†**Ky., Fort Knox** — LIGHTING SYSTEM — Con. Q.M., constructing and completing street lighting system, to A. A. Electrical Co., 3125 South 60th Court, Cicero, Ill., $19,322.

Mass., South Boston (sta. Boston)—TRESTLE—White Fuel Corp., 888 East 1st St., steel trestle in connection with coal handling plant, to New England Structural Co., 310 2nd St., Everett. Bids Aug. 6. Noted Aug. 9, under "Industrial Buildings."

N. Y., Rensselaer—BULK STORAGE, etc.—Texas Co., 135 East 42nd St., New York, bulk storage and distribution system, on Hudson River, near here, separate contracts. To exceed $50,000. Private plans.

N. Y., Ridgewood—COKE SILO, etc.—P. Dietz Coal Co., 71st Ave. and Cypress Hills St., 2 story coke silo, etc., 71st Ave. and Cypress Hills St., to Fanning Schuett Eng. Co., 4325 North 3rd St., Phila., Pa. Est. about $28,000. Noted Sept. 6.

N. Y., Syracuse—TANKS—Tidewater Oil Co., 17 Battery Pl., New York, constructing foundations, 2,600,000 gal. steel tanks. Foamite-Childs fire protection equipment, plant consists of two 875,000 gal., two 400,000 gal. and one 24,000 gal. tanks. Owner builds. Now taking bids on separate contracts. $36,850. R. E. Benner, c/o owners, engr.

†**Oregon**—RAILWAY—U. S. Eng., Portland, constructing railroad grade for Oregon-Washington R.R. and Navigation Co., between Mile Post 37.58 and Cascade Locks, to San Orino R. Bell and C. T. Malcom, 1120 Board of Trade Bldg., Portland, $846,247. Bids Aug. 31. Noted Aug. 23.

Pa., Mt. Lebanon—PARK, etc.—Mt. Lebanon Twp., park improvements incl. new roads, shelter house, sewers, to John Carson & Sons, 1301 Fulton St., N.S. Pittsburgh. $33,389. **P.W.A.** Noted Aug. 16.

Vt., Burlington—MARINE BULK TERMINAL—Texas Co., Railroad Ave., constructing marine bulk terminal plant, 2,500,000 gal. steel storage tanks, pier, dikes and pipe lines, to C. A. Congdon, 119 Buell St., about $80,000; electrical work to Ham Ploof, 120 Pine St; plumbing, to J. E. Getchell, 50 Monson St., Brockton, Mass. Work under way. Private plans.

MATERIALS AND EQUIPMENT

PROPOSED WORK

PIPE, LUMBER, etc.—**Braintree, Mass.**—See "Sewerage and Waste Disposal, under Contracts Awarded."

CHLORINATOR—**Granite Falls, Minn.**—City plans purchasing 1 chlorinator for Water Dpt. $1,000. O. P. Berg, city clk.

TANK—**St. Louis, Mo.**—Southwestern Bell Telephone Co., 1010 Pine St., applied for permit to install one 1,000 gal. gasoline storage tank at 4003 LaClede Ave.

TANK—**St. Louis, Mo.**—Swift & Co., 700 South Vandeventer Ave., applied for permit to install 1,000 gal. storage tank for oil at 700 South Vandeventer Ave.

FIRE FIGHTING APPARATUS — **Hornell, N. Y.**—City, L. F. Wheatly, mayor, plans purchasing motor fire fighting apparatus and equipment. $12,000. Election Sept. 29, to vote $12,000 bonds.

BIDS ASKED

DUMP TRUCK—**Albany, Calif.**—City Council, H. W. Brewer, clk., taking bids 1½ yd. dump truck.

STORAGE TANK—**Fresno, Calif.**—Oct. 10, by Trustees Central Union High School Dist., 1 gasoline storage tank, prices desired on 7,000 and 10,000 gal. capacity tanks, constructed of ¾ and ¼ in. steel.

TRANSFORMERS—**Los Angeles, Calif.**—Oct. 9, by D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing, delivering outdoor, oil insulated self cooled station type distribution transformers (1) three 500 KVA, 34,500 V (2) three 200 KVA, 34,500 V, (a) f.o.b. cars bidders shipping point (b) f.o.b. cars or trucks, 1630 North Main St., Spec. 1511.

TRANSFORMERS—**Modesto, Calif.**—Oct. 8, by C. S. Abbott, secy. Modesto Irrigation Dist., furnishing, delivering high voltage transformers, Spec. E-20; feeder voltage regulators, Spec. E-21, for Electric Dpt. of Dist.

CAST IRON SPECIALS, etc.—**San Francisco, Calif.**—Oct. 5, by T. A. Brooks, city purch. agt., City Hall, 79 tons sleeves, 21 tons crosses, 34 tons tees, 35 tons hydrant tees, 16 tons valve reducers, 9 tons steel elbows, Bid 1260; 34 tons sleeves, 81 tons hydrant tees, 5 tons offsets, 8 tons line reducers, 27 tons valve reducers, 20 tons elbows, 12 tons caps, 9 tons plugs, Bid 1261.

†PUMPING UNITS, etc.—**Denver, Colo.**—Oct. 15, by Bureau Reclamation, 3 deep well turbine type motor driven pumping units of 5,000 gal. capacity, 1 deep well turbine type, etc.

GRAVEL, etc.—**Galesburg, Ill.**—Knox Co. Hy. Dpt. in market 4,800 tons gravel for surfacing; 90 tons gravel for C1-X concrete; 70 tons sand; 11,420 lb. reinforcing steel; 348 lin.ft. rein.-con. pipe, f.o.b. Altona. A. R. Smith, Galesburg, engr.

ELECTRICAL DISTRIBUTION EQUIPMENT—**Brooklyn, Ind.**—Town, L. J. Powell, clk. taking bids equipment for electrical distribution.

VITRIFIED CLAY PIPE—**North Adams, Mass.**—Oct. 4, by City, J. P. Miller, comr. P. Wks., 4,396 ft. 8 in. and 234 ft. 6 in. vitr. clay pipe, 60 pcs. 8x4 in. vitr. clay wyes, 2 pcs. 6x4 in. vitr. clay pipe wyes, 3,100 lb. asphaltic joint compound, 22 manholes, frames and covers, 75 bbl. portland cement, 8,000 ft. 2x8 in.x8 in. spruce plank, 2,000 ft. 4x6x16 in. spruce timber.

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Materials, etc. (Continued)

SNOW REMOVAL UNIT — **Detroit Lakes, Minn.**—Oct. 4, by Becker Co., C. T. Ebeltoft, aud., 1 truck-type snow removal unit, 3½ to 6 tons with cab. E. G. Chilton, Detroit Lakes, co. engr.

GRADER—**Worthington, Minn.**—Oct. 2, by C. J. Kall, aud. Nobles Co., 1 motor power grader.

BRIDGE LUMBER—**Laurel, Miss.**—Oct. 3, by Bd. Supervs. Jones Co., 150,000 ft. treated and 60,000 ft. untreated bridge lumber. W. L. Busby, clk.

†CABLE—**Vicksburg, Miss.**—Oct. 5, by U. S. Eng., Box 667, 500 lin.ft. electric power cable, size 300,000 C.M.

†MALLEABLE IRON SHOULDER BUSHINGS, etc.—**Vicksburg, Miss.**—Oct. 4, by U. S. Eng., Box 667, standard black malleable iron shoulder bushings, standard black malleable iron caps, steel pipe couplings, etc.

†WIRE ROPE—**Vicksburg, Miss.**—Oct. 3, by U. S. Eng., 3,600 lin.ft. wire rope.

RETUBING WATER TUBE BOILERS—**Buffalo, N. Y.**—Oct. 4, by Dpt. P. Wks., City Hall, retubing 2 horizontal water tube boilers, at Ward Pumping Station for Div. of Water.

INCINERATOR EQUIPMENT—**Warren, Pa.**—Warren Disposal Co. taking bids installation incinerator equipment in new incinerating plant now under construction in Pleasant Twp. Noted May 24, under "Sewerage and Waste Disposal."

†PORTLAND CEMENT—**Knoxville, Tenn.**—Oct. 5 (extended date), by Tennessee Valley Authority, Type B portland cement for Norris and Wheeler Dams and for future needs of Tennessee Valley Authority. Noted Sept. 6.

†ELECTRICAL SUPPLIES — **Huntington, W. Va.**—Oct. 3, by U. S. Eng., electrical supplies, bar and bolt cutters for Lock 14, Ohio River.

†GRATING, etc.—**Huntington, W. Va.**—Oct. 4, by U. S. Eng., grating, bolts, anchor bars, wall armor, reinforcing, etc., for U. S. Lock 14, in Ohio River.

†LOCK GATE—**Huntington, W. Va.**—Oct. 9, by U. S. Eng., miter gate for U. S. Lock 2, Big Sandy River.

†MIXER and AGGREGATE — **Huntington, W. Va.**—Oct. 2, by U. S. Eng., concrete mixer and aggregate batching plant for U. S. Repair Fleet in Ohio River.

TRACTOR—**Sudbury, Ont.**—Municipality in market for tractor.

CONTRACTS AWARDED

CEMENT—**Los Angeles, Calif.**—Metropolitan Water Dist., 306 West 3rd St., transporting 278,000 bl. cement to various points along Colorado River Aqueduct, from Colton and Crestmore to Hayfield Tunnels 1 and 2, to east and/or west portal Cottonwood Tunnel to Mecca Pass Tunnels, to Fan Hill, to West Coachella Tunnel, to West Coachella Tunnel, (1,000 Palms Canyon), and to Whitewater Tunnels 1 and 2, to Southern Pacific Co., 610 South Main St., $108,476. Bids Sept. 10, awarded Sept. 14.

COPPER WIRE—**Los Angeles, Calif.**—Dpt. Water & Power, D. P. Nicklin, purch. agt., 207 South Bway., furnishing, delivering 30,000 lb. No. 4AWG med. harddrawn, 1 strand, triple braid, weatherproof, insulated copper wire, and approximately 10,000 lb. No. 6AWG, med. harddrawn 1 strand, triple braid, weatherproof insulated copper wire. Spec. 1487, to Maydwell & Hartzell, Inc., 455 Coylton St., $16.32 and $16.62 per cwt. Bids Aug. 31, awarded Sept. 18.

CREOSOTED POLES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing, delivering pressure creosoted poles, treated full length, 2,667—25 ft. and 32-35 ft., Spec. 1491, to Consolidated Lumber, 122 West Jefferson Ave., $24,759. Bids Sept. 4, awarded Sept. 18.

CURRENT TRANSFORMERS—**Los Angeles, Calif.**—Dpt. Water & Power, D. P. Nicklin, pur. agt., 207 South Bway., furnishing, delivering 4 outdoor, oil filled, 138,000 V, 500-1,000/600-1,200 to 5 amp. current transformers, incl. oil, spare parts. Spec. 1461, f.o.b. bidders shipping point, to General Electric Co., Pittsfield, Mass., $9,979. Bids Aug. 7, awarded Sept. 13.

HOISTS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Power & Water, 207 Bway., 2 single drum, 2 speed hoists, incl. mounting same on tractors owned by Dpt., to Hutchins Winch Co., 700 East Florence St., $3,700. Bids Aug. 6, awarded Sept. 18.

LIGHTNING ARRESTERS — **Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing, delivering 15 lightning arresters, having rating of 37.5 kv., f.o.b. cars or trucks, 1630 North Main St., to Westinghouse Electric & Mfg. Co., 5201 Santa Fe Ave., $4,173. Noted Aug. 23. Bids Sept. 4, awarded Sept. 18.

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TUNNEL TIMBERS—**Los Angeles, Calif.**—Metropolitan Water Dist., 307 West 3rd St., F. E. Weymouth, engr., Item 2, Lot 1, tunnel timbers, Bid 27681, in connection with Colorado River Aqueduct, to Chas. R. McCormick Lumber Co. of Oregon, foot of Irving St., Portland, Ore., $6,337; Items 3, Lot 1, to E. K. Wood Lumber Co., 4701 Santa Fe Ave., $1,470. Awarded Sept. 14.

DUMP TRUCKS—**Oakland, Calif.**—City Council, 5 Reo type dump trucks, 10,000 lb. capacity, to McGurrin Motors, 3300 Bway., $2,267 each. Bids Aug. 30, awarded Sept. 17.

LEAD—**Oakland, Calif.**—J. H. Kimball, secy. East Bay Municipal Utility Dist., 512 16th St., furnishing 50 tons pipe lead in 100 lb. bars delivered to Corporation Yard, not later than Oct. 15, Proposal 556, to Bunker Hill & Sullivan Mining & Concentrating Co., Crocker Bldg., San Francisco, at $74 per ton. Bids Sept. 12, awarded Sept. 18.

SHUT OFF BOXES—**Chicago, Ill.**—Dpt. P. Wks., City Hall, one thousand 2 in. shut off boxes to Pipe Yard B, to Illinois Pipe & Bolt Co., 1529 West Ogden Ave., $3,570. Bids Aug. 20, awarded Sept. 21.

STRANDED BRONZE CABLE—**Chicago, Ill.**—Dpt. P. Wks., City Hall, 31,600 ft. ¾ in. stranded bronze cable, to General Cable Co., 20 North Wacker Dr., $2,119. Bids Aug. 29, awarded Sept. 21.

AGGREGATE SPREADERS—**Indiana**—State Hy. Comn., J. D. Adams, chn., Indianapolis, 3 fine aggregate spreaders, to E. R. Payne, Newcastle, $1,226; 9 fine agregate spreaders, to H. W. Taylor, 19 South Senate Ave., Indianapolis, $2,835.

RAILS—**New Orleans, La.**—Cincinnati, New Orleans & Pacific R.R., c/o Southern Railway Co., Terminal Sta., 2,000 tons rails, to Tennessee Coal, Iron & R.R. Co., Brown-Marx Bldg., Birmingham, Ala. Est. about $70,000.

†ELECTRIC MOTORS—**Portland, Me.**—Superintendent Lighthouse Service, 1st Dist., Portland, 2 electric motors with controls for Lighthouse Depot, to Crocker-Wheeler Mfg. Co., Ampere, $1,063. Awarded Sept. 13.

GATE VALVES—**Townsend, Mass.**—Town, Bd. Water Comrs., gate valves for water construction project, to Eddy Valve Co., Waterford, N. Y., $1,073. **P.W.A.** Whitman & Howard, 89 Broad St., Boston, engrs.

GRADER BLADES—**Tupelo, Miss.**—State Hy. Comn., Jackson, 2 carloads grader blades, to Continental Gin Co., 4600 4th Ave. S., Birmingham, Ala., $9,539•••4 automobiles (Plymouth), with trade in, to Graham Motor Co., Jackson, $793 each or $3,172•••1 automobile (Ford Sedan), trade in, to Jordan Motor Co., Iuka, $633•••1 automobile (Ford Sedan) no trade in, to Cook Motor Co., Forest, $598. Grand total $13,942. Bids Sept. 4, awarded Sept. 10.

SEWER PIPE—**Jamestown, N. Y.**—Dpt. P. Wks., City Hall, to W. F. Endress, Inc., Foote Ave. and Harrison St., 3 and 4 in. vitr. sewer pipe at 1.75c. per lin.ft.; 8 in. 22.25c. per lin. ft.; 30 in. $3.125 per lin.ft. Bids Sept. 15.

RAILS, etc.—**New York, N. Y.**—Bd. Transportation, J. D. Delaney, chn., 250 Hudson St., rails and switches, etc., to Bethlehem Steel Co., 25 Bway., $201,204. Bids Aug. 14. Noted Aug. 2.

PIPE—**Memphis, Tenn.**—City, 2,000 ft. 10 in. pipe for watermain in Exchange Ave., to U. S. Pipe & Fdry. Co., Webb Crawford Bldg., Birmingham, Ala., at $1.25 per ft.

CENTRIFUGAL PUMP—**Austin, Tex.**—City, c/o J. G. Morgan, mgr., 1 motor-driven water service centrifugal pump, to Allis-Chalmers Mfg. Co., Frost Natl. Bldg., San Antonio, $13,000. **P.W.A.** J. E. Motheral, city engr.

BITUMINOUS MATERIAL, etc.—**Wisconsin**—State Hy. Comn., Madison, applying bituminous material in Kenosha Co., to Sarrington Milling Co., Lake Delton, $1,213; crushed stone surfacing in Whitestown, Vernon Co., to Interstate Constr. Co., Madison, $35,100.

PIPE, etc.—**Kenosha, Wis.**—Park Bd. 17,000 ft. water pipe and fittings, to Josephson & Zimmerman, Kenosha, $5,685.

FOREIGN

Armenia, Erivan—Soviet Government, or c/o Amtorg Trading Corp., 261 5th Ave., New York, tobacco factory, increasing plant capacity to 5 billion cigarettes annually, day labor. To exceed $500,000.

Australia—Victorian Government, **Melbourne**, preparing plans electrical development and tenders will be called this year: 110,000 hp. Kiewa River Scheme; 188,000 hp. Mitta-Hume Scheme and 90,000 hp. Snowy River Scheme, est. above $30,000,000•••New South Wales Government, **Sydney,** plans harnessing and using for development, the Tooma and Shoalhaven Rivers.

Ecuador, Quito—Nov. 13, by Municipal Engineer, supplying, erecting 2 water turbines each 1,60 hp. direct coupled to 1,250 kva. alternator, with transformers, cables, street lighting apparatus equipment d.c. generator, etc.

Egypt, Giza—Dec. 8, by Ministry of Public Instruction, supplying electrical apparatus for electrical laboratory of Rojal School of Engineering, and incl. fuse boxes, cables, switchboards, calibrating equipment, insulators, instruments etc.

England — Lindsay Parkinion & Co., Ltd., plans constructing hotel this month, **Bispham**, $1,500,000•••Cheshire Co. Comn., plans extending hospital, **Chatterbridge,** $485,500••• West Riding of Yorkshire Mental Hospital Bd. Leeds, voted $600,000 for new mental hospital and addition at **Menton**•••Yorkshire Council for Agricultural Education, taking bids this month for institutional buildings, **Askham Bryan**, $440,000.

England—Burnley Town Council making plans constructing 1,859 houses, $2,500,000•••**Newcastle** City Council making plans wharf, $510,000•••and Charles Churchill & Co., preparing plans constructing machine tool manufacturing plant, **Birmingham,** $400,000.

England — Great Western Railway, making plans converting steam driven pumps and shop machinery into electrically operated; in **Oxford•••Dunstable** Town Council awarded contract 135 houses to Gerrard & Son Ltd., $214,995•••**Trowbridge** Urban Council, 134 houses to A. E. Smith, $189,290•••**Manchester** City Council, city hall addition, to Redpath, Brown & Co., Trafford Park, $450,000•••**Blackpool** Town Council voted $1,250,000 for sports stadium, tenders this fall.

England—Whitby Urban Council making plans constructing 274 homes at Gallowchire, $411,000•••**Burney** Town Council purchased site and plans this year 1,600 houses, $2,000,000••• First Natl. Trust Ltd., 10 The Boltons, South Kennington, London, plans 300 houses in **Reading,** $450,000.

India—Bombay—Oct. 21, by Bombay Baroda and Central Indian Railway Co., 400 kw. heavy oil engine driven generator set.

Irish Free State, Dublin—Pearl Insurance Co. making plans office building on Westmoreland St. $500,000.

New Zealand—Oct. 12, by **Dunedin** City Engineer, supplying 2¼ tons hard drawn copper trolley wire; Nov. 1, by Deputy Minister Dpt. Posts & Telegraphs, **Wellington,** supplying 2 dynamotor sets to operate from 12 volts d.c. and 1 set to operate from 32 volt d.c. with output of 125 milliamperes at 1,250 volts, also 6 sets to operate from 12 volts d.c. with outputs of 100 milliamperes at 400 volts.

New Zealand, Wellington—Oct. 16, by Secretary Pub. Wks., Supplies & Tenders Com., 100,000 volt liquid fuses complete with fittings and 3 spare fuses.

New Zealand, Wellington—Oct. 28, by Secretary Public Wks., Supply & Tenders Com., for supplying 1 forebay water level recorder and transmitter.

Norway, Oslo—Municipality preliminary plans air and sea plant base. $3,000,000.

Persia, Teheran—Ministry of Communications taking bids erecting complete harbor, at Deh Noe on Caspian Sea. $10,000,000. Details at nearest Consulate.

Peru, Lima—L. M. Stone, Edificio Canerare, Plaza San Martin, in the market for quantity of lumber, Douglas fir and rough merchantable. Custom duty s/o .04 per MZ basic rates.

Scotland, Stirling—Town Council making plans 700 homes. $1,100,000. Private plans.

Siberia, Krasnoyarsk—Paper Combine, Krasnoyarsk, Siberia, c/o Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, pulp and power plant with annual capacity 26,000 tons newsprint, 36,000 tons writing paper and 4,000 tons cardboard by day labor. To exceed $1,900,000.

Straits Settlements, Singapore—Nov. 5, by Municipal Water Engineer, stop and bib taps galvanized wrought iron unsocketed tubes and malleable iron pipe fittings, for 1935 supply.

Tasmania, Hobart—Oct. 27, by Chairman Hydro Electric Comn., supplying 4 single phase outdoor type, oil cooled double wound transformers for Boscheray sub-station.

†*Federal Government*

Foreign, etc. (Continued)

Union Socialist Soviet Republics—Commissariat of Heavy Industry, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, peat briquet plant, 200,000 tons annual capacity, in Orekhovo-Zuev Region, by day labor. $7,000,000.

Union Socialist Soviet Republics—Commissarit Water Transportation, or c/o Amtorg Trading Corp., 261 5th Ave., New York, new piers and wharves on Black Sea, at Sochi, Mazesta, Khosta and Gagry, by day labor. $2,500,000.

Union Socialist Soviet Republics—Municipality of Kharkov, c/o Soviet Government, or c/o Amtorg Trading Corp., 261 5th Ave., New York, for Krasnozavodsk central heating plant in Kharkov, by day labor. To exceed $1,000,000.

Uruguay—Ministry of Pub. Wks., Montevideo, bids about Jan. 15, hydro-electric plant, on Rio Negro River. To exceed $1,000,000.

Uruguay, Montevideo—Oct. 19, by State Electric & Telegraph Administration, supplying substation equipment, incl. 6,600 volt feeder cubicle, transformers cubicle, and high and low tension switchgear; Oct. 29, 97,500 metres, of lead covered V.I.R. cables of various sizes; Oct. 31, knife rotary and pear shaped switches. Details at nearest Consulate.

Venezuela, Island of Aruba—Standard Oil Co. of New Jersey, 26 Bway., New York, oil refining equipment, to Foster Wheeler Corp., 165 Bway., New York, $1,000,000.

DETAILS OF PWA NON-FEDERAL ALLOTMENTS

Loans and Grants Except as Noted. *Grant. †Loan.

KEY TO SYMBOLS

m-meters	**c**-canal
p-pump	**dm**-dam
t-tank or standpipe	**r**-reservoir
f-filtration	**t**-treatment plant
d-distr. supt.	**b**-building
w-well	**i**-iron removal
s-supply	**pw**-power line
g-generator	**sf**-softening
ch-chlorinators	**bl**-boilers

Water Works

*Abington, Mass., **d**	$8,000
Butler, Ohio, **w-p-r-d**	40,000
Ringgold, La., **w-p-t-r-d**	39,000
Sunset, La., **w-p-t-d-m**	29,000

Sewers

Falls Church, Va.	177,000

Schools

Clarke County, Ala.	60,000
*Rawlins County, Kan.	11,700
Weber County, Utah (North Ogden)	200,000

Miscellaneous

*Cincinnati, Ohio (Park improvts)	14,700

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Bakersfield—Bakersfield Union High School Dist. defeated bonds school auditorium, $300,000. C. H. Biggar, Haberfelde Bldg., archt. Noted Aug. 30.

Calif., Daly City—Jefferson School Dist., election Oct. 5, to vote bonds 3 schools, $35,000 each. A. F. Roller, Crocker 1st Natl. Bank Bldg., San Francisco, archt.

Calif., Palo Alto—City, Municipal Utilities Dpt., preparing plans butane gas plant auxiliary to municipal gas plant, incl. 2 fuel containers, compressors, heat exchanges, and regulators and small building to house plant, $20,000. Work will probably be done by city forces. L. H. Anderson, city dir. of Utilities.

Calif., Pasadena—Pasadena Bd. Educ. approved working drawings of C. Bennett, 311 First Trust Bldg., and soon takes bids reconstructing, repairing and rehabilitating Madison Elementary School, consisting of removing portion of exterior brick walls and rebuilding with gunite, new rein.-con. found., plastering, acoustical treatment, plumbing, electric wiring, painting, etc. $110,000. P.W.A. grant of $26,940.

†*Federal Government.*

Calif., Pasadena—Bd. Educ. sketches by Marston & Maybury, 25 South Euclid Ave., rein.-con. school at Jefferson Elementary School site, $110,000. $26,687 P.W.A. grant.

Calif., Sacramento—Burns & McDonnell Eng. Co., engrs., 107 West Linwood Blvd., Kansas City, Mo., have completed report and will start on plans soon for power plant for Sacramento Dist., c/o A. Given, ch. engr. Est. $20,000,000.

Calif., San Bernardino—San Bernardino Valley College Dist., election Oct. 19, $268,000, to partially finance $350,000 building program. G. Stanley Wilson, Mission Inn, Riverside, and Chas. E. Parke, asst., and H. E. Jones, 615 Anderson Bldg., archts. Noted Aug. 23.

Calif., San Francisco—City and San Francisco Co. postponed plans indefinitely for livestock pavilion due to revisions in budget it is possible that construction will not be undertaken until new budget is prepared next year. $500,000. Noted June 21.

Calif., South San Francisco—Chamber of Commerce compling estimates of cost of diesel operating electric power plant for report to City Council to operate as municipal project.

†**Ill., Melrose Park**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected. Noted Aug. 24, 1933.

†**Ind., Alexandria**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, Church and Washington Sts. $60,000.

Ind., Indianapolis—School Comrs., 150 North Meridian St., plans by Vonnegut-Bohn and Mueller, 610 Indiana Trust Bldg., 2 story, basement, brick, stone, rein.-con. addition to Broad Ripple High School, East 63rd St. $105,000.

Ind., Indianapolis—City Hospital, 960 Locke St., plans completed by Kopf & Deery, 620 Pythian Bldg., city hospital addition. $105,000. P.W.A. loan granted.

Ia., Decorah—Bd. Educ., c/o Secretary, voted $100,000 bonds rein.-con., brick, stone school. $125,100. P.W.A. allotted $125,100.

†**Ia., Harlan**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Kan., Hoistington—City, reports completed and plans bond election soon for complete municipal light plant and distribution system. $150,000. W. B. Rollins & Co., 339 Railway Exch. Bldg., Kansas City, Mo., engrs. Noted Sept. 6.

Kan., Paola—Bd. Educ. defeated $65,000 bond issue for 3 story, basement, brick, stone, rein.-con. school addition and repairs, East Peoria and Walnut Sts. $120,000. Thos. W. Williamson & Co., 1202 Nat. Bank of Topeka Bldg., Topeka, archts.

Ky., Newport—Bd. Educ. plans by C. C. and S. K. Weber, St. Paul Bldg., Cincinnati, O., 3 story, basement, 67x280 ft., brick, rein.-con. school, plain found., 4th and Monmouth Rds. $300,000. P.W.A. project.

Md., Annapolis—State, Bd. P. Wks., Union Trust Bldg., Baltimore, plans by H. P. Hopkins, 16 East Mulberry St., and takes bids in fall altering and constructing 2 story, basement additions to Court of Appeals building.

†**Md., Hyattsville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Mass., Bourne—Town, Superintendent of Schools, Town Hall, soon takes bids 2 story, basement, 56x62 ft. and 64x110 ft. brick high school addition, concrete found., incl. mechanic arts shop. $116,000 or more. S. W. Haynes & Assoc., 336 Main St., Fitchburg, archts.

Mass., Gardner—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, plans by C. P. Hoyt, 344 Boylston St., Boston, brick, concrete, steel shop building at State Colony. $47,750. P.W.A. project.

Mich., Engadine—Bd. Educ. Mackinac Co., plans by G. Arntzen, Escanaba, 2 story, basement, brick, steel, rein.-con. school, plain found. $105,000.

Mich., Paw Paw—Bd. Educ. plans by Lane Davenport, Inc., 610 Donovan Bldg., Detroit, 2 story, 100x125 ft. brick, rein.-con. addition to school, incl. auditorium, lockers, shower rooms, plain found. $110,000.

Miss., Greenville—City report in progress municipal power plant and distribution system. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., engrs.

Mo., Clayton—P.W.A. rescinded $318,000 grant for constructing 7 story, basement, rein.-con., court house and $70,200 for 4 story, basement, 56x216 ft. rein.-con., terra cotta addition to St. Louis County Hospital, for St. Louis Co. Noted May 24.

Mo., Farmington—City will not build municipal light and power plant and distribution system. City will not accept $141,000 P.W.A. funds allotted it, prior to the allotment of these funds, the city officials notified P.W.A. state headquarters in St. Louis to withdraw its application for the P.W.A. money. Project abandoned. Noted Sept. 13.

Mo., Jefferson City—State appointed C. S. Haskins, of C. S. Haskins & Co., 517 Finance Bldg., Kansas City, as superv. archt. and engr. for various state eleemosynary and penal institutions. $13,778,000. L. R. Bowen, appointed assistant supervising archt. for designing buildings for eleemosynary institutions and E. S. Kleine is to be assistant supervising archt. for penal institutions. P.W.A. project. Noted May 24.

†**Mo., Windsor**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†**Mont., Glendive**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Mont., Havre — Northern Montana College, plans by F. Bossout, Havre, new university building. $166,000. P.W.A. loan granted.

Mont., Kalispell—Flathead Co. School Dist. plans by F. A. Brinkman, Kalispell, constructing classrooms, shop and auditorium. $210,000. P.W.A. loan granted. Noted Mar. 29.

Neb., Norfolk—City making plans electric power plant and distribution system. Black & Veatch, 700 Postal Bldg., Kansas City, Mo., engrs.

N. M., Albuquerque—University of New Mexico, c/o J. J. Dempsey, pres. Bd. Regents, plans by J. G. Meem, Sunmount, Santa Fe, administration and laboratory building. $250,000. P.W.A. loan granted.

N. J., Clifton—City plans by Lee & Hewitt, 152 Market St., Paterson, school. $125,000.

N. J., Palisades Park—Boro. J. Kosinski, clk., Boro Hall, plans boro hall and fire house. To exceed $100,000. Architect not appointed.

N. J., Teaneck—Bd. Educ. plans by Hacker & Hacker, 201 Main St., Fort Lee, high school. $635,000.

N. Y., Brooklyn—Dpt. Health, Centre St., New York, plans by H. C. Pelton, 415 Lexington Ave., health center, Morgan Ave. Est. about $200,000. P.W.A. funds allotted.

N. Y., Brooklyn—Bd. Educ., 500 Park Ave., New York, plans by W. C. Martin, Flatbush Ave. extension and Concord St., 4 story, addition to P. S. 225, 1069 Ocean Ave., Humbert and Ripple Sts. $220,000.

N. Y., Churchville—Bd. Educ. Union Free School sketches by L. J. Brew, 277 Lexington Ave., Rochester, 3 story school. $100,000 plus $85,000 P.W.A. loan granted. C. Ade, 80 East Ave., Rochester, engr.

N. Y., Fairmont—Bd. Educ., Camillus School, $142,000. Project in abeyance. P.W.A. rescinded allotment. Wright & Ellis, City Bank Bldg., Syracuse, archts. Noted Apr. 26.

N. Y., Hammondsport—Bd. Educ., plans by R. R. Graham, 25 Prospect St., Middletown, grade and high school. E. E. Seelye & Co., 101 Park Ave., New York, engrs. P.W.A. project.

N. Y., Huntington—Bd. Educ. withdrew application for funds and will not build high school. Project abandoned. $550,000. Tooker & Marsh, 101 Park Ave., New York, archts. Noted Dec. 5.

N. Y., Manhasset—Bd. Educ. election Oct. 5, to vote on proposition to construct high school. $500,000. P.W.A. project. C. B. Coulter, pres. Noted July 19.

N. Y., Naples—School Dist. 1, sketches completed by R. R. Graham, 25 Prospect St., and working drawings will commence as soon as P.W.A. loan is granted for 2 story, basement, brick, steel grade and high school. $106,000. Noted Mar. 1, 1934.

N. Y., New York—Dpt. of Health, Centre St., plans health center, 140th St. and Willis Ave. Est. about $200,000. P.W.A. funds allotted. **Maturity soon.** W. H. Gompert, 40 East 49th St., archt.

N. Y., New York—Dpt. Health, Municipal Bldg., plans by Sibley & Fetherson, 205 West 42nd St., biological laboratory, 16th St. $500,000 or more. P.W.A. funds allotted.

N. Y., Solvay—New York State Fair Comm., Albany, making plans livestock exhibit building, $105,000. Applied for funds to New York State Legislature, T. J. Farrell, Albany, engr.

N. Y., South Fallsburg — Bd. Educ., plans completed by E. P. Valkenburgh, 7 Linden St., Middletown, 2 story, basement, 77x80 ft., steel, brick school, plain found. To exceed $105,000. Awaiting P.W.A. approval.

N. Y., Syracuse—Bd. Supervs. Onondaga Co. plans nurses home, Onondaga Hill, in connection with Onondaga County Sanitarium. $150,000. Application made for T.E.R.A. funds. Randall & Vedder, S. A. & K. Bldg., archts.

N. Y., Union—Free Dist. Schools of Union, Endicott School. $500,000. Project in abeyance. P.W.A. allocation rescinded. A. R. Lacey & Sons, 52 Exchange St., Binghamton, archt. Noted Mar. 29.

N. Y., Woodhaven—Dpt. Parks, Arsenal Bldg., Central Park, N. Y., plans shop, garage and storage, Union Turnpike and Cross Island Blvd. Private plans.

†**N. C., Morganton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

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Public Buildings (Continued)

N. D., Leeds—City plans municipal electric light and power plant. $45,000. Application for funds filed with P.W.A. T. R. Atkinson, Bismarck, engr.

O., Apple Creek — State plans by J. P. Schooley, state archt., new cottage for institution for feebleminded. $237,500. P.W.A. project.

O., Athens—State plans by J. P. Schooley, state archt., new cottage at State Hospital. $85,000. P.W.A. project. Noted Nov. 16.

O., Cincinnati — State plans by J. P. Schooley, state archt., completion of Men's cottage, $104,500, new cottage, $142,500, also construction of new women's cottage, at Longview State Hospital. P.W.A. project.

O., Cleveland—State plans by J. P. Schooley, state archt., new cottage at State Hospital. $145,000. P.W.A. project.

†Okla., Wewoka—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†Pa., Brownsville—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†Pa., Clarks Summit—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Pa., Mount Carmel—School Dist. of Mt. Carmel plans new high school. $150,000. **Maturity indefinite.** Architect not appointed. It is planned to seek Federal loan for same.

Pa., New Castle—City Council, C. B. Mayne, mayor, plans $3,750,000 bond election for municipal light and power plant. **Maturity indefinite.** G. H. Hoskins, City Hall, city engr.

†Pa., Phila.—Yards & Docks, Navy Dpt., Wash., D. C., bids in fall, constructing aircraft factory, administration building and maintenance shop additions, new engine manufacturing shop, at Navy Yard. $2,600,000. Noted June 14.

†Pa., Pittsburgh—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing South Hills Postal Station. Site selected.

†Pa., Red Lion—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans constructing U. S. Post Office. Site selected.

Pa., Warren—Borough, R. W. Steber, Burgess, plans municipal light and power plant. C. Barvis, city engr. **Maturity indefinite.** Architect not appointed.

R. I., Kingston—State, Dr. F. J. Farnell, chn. Pub. Welfare Comn., State House, Providence, plans by E. E. Cull, 75 Westminster St., Providence, 1 story, basement, irregular sized, brick, steel, concrete industrial building, dairy barn and garage at State College. $95,880. P.W.A. project.

R. I., Kingston—State, Bd. Pub. Roads, State Office Bldg., Providence, sketches, 1 story maintenance garage, on state hy. in North Kingston. Est. about $28,500. D. A. Soule, 30 Arline St., Providence, engr.

†R. I., South Kingston—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 3 story, basement, brick, steel post office, concrete found. $95,000. A. Harkness, 1428 Industrial Trust Bldg., Providence, R. I., archt.

†S. C., Ware Shoals—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Tex., El Paso—National Tubercular Hospital for Negroes, c/o Dr. L. A. Nixon, 2029 Myrtle Ave., plans by P. W. McGhee, 1st Natl. Bank Bldg., 1-4 story, brick, rein.-con. hospital plant, incl. 4 ward buildings, 100 beds each, for men, and 4 ward buildings, 100 beds each for women, childrens tubercular hospital 168 beds, 150,000 gal. water storage tank, electric system, heating system, fully equipped laboratory and operating rooms, etc., $2,500,000. Application for P.W.A. funds made.

Tex., San Antonio—Bd. Educ., Water and Lavaca Sts., plans by A. B. and R. M. Ayres, Smith-Young Tower, and Phelps & DeWees, Gunter Bldg., Bd. Archts., semi-fireproof brick, concrete, rein.-con. school, plain found., Woodlawn Sect., $200,000; plans by Phelps & DeWees, superv. archts., Gunter Bldg., and G. Willis, c/o Builders Exch., 2 story, 140x270 ft., brick, rein.-con. high school, plain found., South Side, $700,000; plans by Phelps & DeWees, Gunter Bldg., improvements and additions and remodeling to present school buildings, $447,000. P.W.A. loans granted on first and authorized on latter 2 projects. Noted Jan. 11.

Tex., Seguin—Guadalupe Co., Court House, plans by L. M. Wirtz, Seguin, and takes bids in about 40 to 60 days 3 story, rein.-con. court house, $165,000; making plans and takes bids in about 30 days 3 story, 35x42 ft. jail, incl. jail equipment, kitchen, etc., $35,000. P.W.A. allotted $200,000 for same. Noted Aug. 23.

Tex., Wink—City having estimates made of cost of constructing municipal electric light and power plant, preparatory to submitting proposal to vote of the people.

Utah, Ogden—Weber Co. School Dist. plans remodeling and extending existing school buildings. $200,000. P.W.A. loan granted. M. C. Wood, Eccles Bldg., archt.

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Vt., Brattleboro—Town, Electric Light Comn., A. P. Carpenter, chn., 32 Main St., to decide at town meeting in March, 1935, about municipal electric plant. Noted Aug. 3, 1933.

†Wash., Prosser—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†Wash., Puyallup—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

†Wyo., Wheatland—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Site selected.

Alta., Banff—H. C. Beckett, archt., Riverside, preparing plans administrative and registry buildings, Banff National Park. $150,000.

BIDS ASKED

†Ariz., Grand Canyon—Oct. 9, by U. S. Natl. Park Service, constructing post office, 4 residences, fire equipment storage building.

Calif., San Jose—Oct. 8 (extended date), by City Counicl, C. B. Goodwin, mgr., 3 story, rein.-con., steel municipal auditorum, Market and San Carlos Sts., $300,000 or more. Binder & Curtis; 35 West San Carlos St., archts. Noted Aug. 30.

†D. C., Wash.—Oct. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., changes to present buildings, etc., at National Institute of Health, and elevators.

†Ga., Waycross—Oct. 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. Noted Sept. 6.

Ill., Chicago—Oct. 4, by H. E. Wallace, acting clk. Sanitary Dist. of Chicago, 910 South Michigan Ave., erecting and installing hydro-electric units with appurtenances and other miscellaneous work for Lockport Power House, Div. E, on Sanitary Dist. Main Channel, 1 mi. south of 16th St., Lockport.

†Ill., Danville—Oct. 9, by Vet. Bu., Arlington Bldg., Wash., D. C., constructing dining hall, altering building and connecting corridor at U. S. Vet. Administration Facility. Noted Sept. 6.

†Ind., Terra Haute—Oct. 15, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†Ky., Louisville—Oct. 15, by Treas. Dpt. at office Sup. Archts., Wash., D. C., changes in heating system.

†Me., Calais—Oct. 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing inspection station and garage.

†Me., Grand Isle—Oct. 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., customs inspection station.

Mass., Andover—Oct. 13, by Town, F. H. Hardy, chn. Building Com., Town Hall, for Junior High School, 2 and 3 story, basement, 66x170 ft. and 60x90 ft., brick, concrete, stone, $400,000. P.W.A. project. Perley F. Gilbert, 53 Central St., Lowell, archt. Kilham, Hopkins & Greeley, 126 Newbury St., Boston, consult. archts. Office of H. French, 210 South St., Boston, engr. Noted May 3.

†Mass., Boston—Oct. 5, by Treas. Dpt. at office Sup. Archt., Wash., D. C., mail handling equipment in U. S. Parcel Post Building.

†Mass., Dedham—Oct. 9, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 13.

†Mo., St. Louis—Oct. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., foundations for new U. S. Post Office. Total est. $5,345,000. Noted July 19.

Mo., St. Louis—Oct. 3, by Bd. Educ., 911 Locust St., for Peter Herzog School, 2 story, basement, 72x168 ft., rein.-con., brick, Pamphlin Ave. and North Pointe Blvd. $210,000. P.W.A. project. E. T. Friton, c/o owner, archt. and engr.

†Neb., Lexington—Oct. 11, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $45,000. Noted Feb. 16, 1933.

N. J., Marlboro—Oct. 5, by Dpt. Institutions & Agencies, State Office Bldg., Trenton, 2 story, brick housing units. $300,000. To be approved by Federal Emergency Administration. C. N. Leathem, State Bldg., Trenton, archt. Noted July 26.

N. Y., Creedmoor—Oct. 10, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing, heating, sanitary work, electrical work, for assembly hall, service connections, at Brooklyn State Hospital, Creedmoor Div.

N. Y., East Rockaway—Oct. 2, by Bd. Educ., school. $295,000. Noted Apr. 5.

†N. Y., Ellis Island—Oct. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., new building at U. S. Immigration Station.

N. Y., Hunter—Oct. 1, by Bd. Educ., Middletown, elementary and junior high school, $400,000. P.W.A. project. R. R. Graham, 25 Prospect St., Middletown, archt. E. E. Seelye & Co., 101 Park Ave., New York, engrs. Noted Sept. 20.

N. Y., Newark—Oct. 17, by Commissioner Dpt. Mental Hygiene, State Office Bldg., Albany, heating work, power plant equipment at Newark State School.

N. Y., Ossining—Oct. 11, by Dpt. Correction, State Office Bldg., Albany, additional heating work, service connections, Sing Sing Prison.

N. Y., Pine Aire Station—Oct. 17, by Commissioner Dpt. Mental Hygiene, State Office Bldg., Albany, construction, heating, sanitary, electrical work and special electric fixtures in Assembly Hall, power house equipment and service connections, Pilgrim State Hospital.

N. Y., Pine Aire Station—Oct. 24, by Commissioner Mental Hygiene, State Office Bldg., Albany, construction, heating, electrical sanitary work and special electric fixtures for Farm Colony Building 76, and single cottages, Buildings 77, 78, 79, Pilgrim State Hospital.

N. Y., Poughkeepsie—Oct. 3, by Commission, Dpt. Mental Hygiene, State Office Bldg., Albany, replacing stone work, Hudson River State Hospital.

N. Y., Tannersville—Oct. 1, by Bd. Educ., constructing Junior and Senior High School. To exceed $300,000. R. R. Graham, 25 Prospect St., Middletown, archt. E. E. Seelye & Co., 101 Park Ave., New York, engrs. Noted Sept. 20.

Ore., Corvallis—Oct. 9, by H. L. Mark, clk. Consolidated Dist. 9, 3 story, basement, brick high school. $100,000. Whitehouse, Stanton & Lee, Railway Exch. Bldg., Portland, archts. Noted Aug. 30.

†Pa., Gettysburg—Oct. 11, by Dpt. Interior, at office Superintendent Gettysburg Natl. Military Park, constructing utility building, 2 comfort stations and 2 entrance stations.

†Pa., Scottdale—Oct. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $49,500.

R. I., Cranston—Oct. 2, by City, City Property Comn., City Hall, 2 story, 106x148 ft. brick, concrete, steel, limestone equipment terminal, concrete found., Phoenix Ave., for P. Wks. Dpt. $50,000. Shapiro & Ekman, Old Colony Bank Bldg., Providence, archts.

Tenn., Knoxville—City, City Hall, bids about Oct. 10, for Junior High School, part 1 and part 2 story, 270x320 ft. brick, rein.-con., plain found., Warren Ave. $200,000. P.W.A. project. Barber & McMurry, 517 West Church Ave., archts.

Tenn., Knoxville—City, City Hall, bids about Oct. 20, 2 story, part basement, 145x285 ft. brick school, plain found., Linden Ave. $140,000. P.W.A. project. Beaumann & Beaumann, Market St., archts.

Tex., Fort Worth—Oct. 9, by Bd. Educ., c/o E. P. Williams, bus. mgr., 409 East Weatherford St., additional classrooms, library, cafeteria, auditorium and medical units addition to Alice E. Carlson School. $100,000. P.W.A. project. J. R. Pelich, Trinity Life Bldg., archt.

†Wash., Almira—Oct. 12, by Bureau Reclamation, Dpt. Interior, school at government camp at Grand Coulee Dam, Columbia Basin Project, about 22 mi. northwest of here, Spec. 591.

†Wis., Eau Claire—Oct. 19, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. Noted July 6, 1933.

†T. H., Honolulu—Oct. 12, by Treas. Dpt. at office Sup. Archt., Wash., D. C., sprinkling system in U. S. Immigration Station.

CONTRACTS AWARDED

†Ala., Anniston—Treas. Dpt. at office Sup. Archt., Wash., D. C., extending U. S. Post Office, to Upchurch Constr. Co., Montgomery, $140,430. Bids Sept. 17. Noted Sept. 6.

Calif., Norwalk—Norwalk Elementary School Dist., 100x100 ft., rein.-con. classroom building to Campbell Constr. Co., 951 South Genesee St., Los Angeles, $112,306. Awarded Sept. 11.

Conn., Hamden—Town, R. F. Collins, chn. School Com., Hamden Memorial Town Hall, 2 story, basement, 60x370 ft., 80x85 ft. and 95x120 ft., brick, cast stone, granite and steel high school, to Industrial Constr. Co., 721 Main St., Hartford, $629,600. **P.W.A.** Bids Aug. 24, awarded Sept. 14. Noted Aug. 30 Daily.

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., extending U. S. Internal Revenue Building, to J. McShain, 1610 North St., Phila., Pa., $1,212,633, alternate add $3,200. Noted Aug. 30.

†D. C., Wash.—Yards & Docks, Navy Dpt., Wash., D. C., repairing and altering medical school, Spec. 7730, to Redmond Contg. Co., 543 South 46th St., Phila., Pa., $2,910. Bids Sept. 12.

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., steel frame building at Virginia Ave. and 2nd St., to Temple Constr. Co., 11 West 42nd St., New York, N. Y., $6,640.

†D. C., Wash.—Treas. Dpt. at office Sup. Archt., Wash., D. C., installing scientific laboratory building, installation, to E. H. Sheldon & Co., Muskegon, Mich., $389,720; miscellaneous changes in or to the building, constructing constant temperature rooms, etc., to Harwood-Nebel Constr. Co., Inc., 2539 Pennsylvania Ave., $167,900. Bids Sept. 11. Noted Aug. 23.

†Federal Government.

Public Buildings (Continued)

†**Fla., Winter Haven**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to J. C. Miller, Campbellsville, Ky., $47,555. Bids Sept. 7.

†**Ill., Camp New Salem**—Twenty-First Forestry Dist., R. M. Madison, commander, Jefferson Barracks, Mo., kitchen and mess hall, bathhouse, 2 latrines, headquarters buildings, 6 barracks buildings first-aid building, pump and power house, garage, forestry office and quarters 1 warehouse, to Levi Nelson, 8136 Eberhart St., Chicago, $23,640. Bids Aug. 30.

†**Ill., Eureka**—Twenty-First Forestry Dist., R. M. Madison, commander, Jefferson Barracks, Mo., kitchen and mess building, bathhouse, 2 latrines, headquarters building, 6 barracks buildings, first-aid building, pump and power house, garage, forestry office and quarters 1 warehouse at Camp Eureka, to Krings & Stengele, Joliet, $23,700. Bids Aug. 27. Noted Aug. 23.

†**Ill., LeRoy**—Twenty-First Forestry District, c/o R. M. Madison, commander, Jefferson Barracks, Mo., general contract altering existing kitchen and mess building, altering and constructing addition to bathhouse, enclosing 2 latrines, constructing headquarters building, forestry building, six barracks buildings, warehouse pump and power house, first aid building and garage, at Camp LeRoy, to Olson-Carson Co., 5141 Blackstone Ave., Chicago, $19,399. Bids Sept. 4.

Ill., Moline — Bd. Educ., general contract Junior High School, 3 story, basement, 64x162 ft., to Lind Constr. Co., 6404 South State St., Chicago•••plumbing and heating, to Moline Heating & Constr. Co., Moline, $23,790••• electrical work, to Leithner & Weishar, Moline, $4,004. Grand total $157,294. **P.W.A.** Bids Sept. 6. Noted Aug. 23.

†**Ind., Decatur**—Decatur Homesteads, Inc., A. A. Watrous, mgr., general contract 48 homes for housing project, to Hogson Bros., 485 5th Ave., New York, N. Y., $91,920. Contractor now taking bids on separate contracts. Noted Aug. 23.

†**Ind., South Bend**—Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office, to R. W. Greening, South Bend, $4,100.

Mass., Danvers—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, electric wiring and fixtures at Danvers State Hospital, to M. B. Foster Electric Co., 514 Atlantic Ave., Boston, $28,500•••installing sprinkler system, to Rockwood Sprinkler Co., 120 Milk St., Boston, $1,687•••constructing steel gravity tank and tower, to Chicago Bridge & Iron Wks., 250 Stuart St., Boston, $11,250. Grand total $41,437. Bids Aug. 31. Noted July 19, under "Contracts Awarded."

Mass., Norfolk—Commonwealth of Massachusetts, Dpt. Correction, State House, 2 story, basement, 92x120 ft. school and library, incl. plumbing, heating, electrical work at State Prison Colony, P.W.A. Project P-8, Docket 2237, to J. Slotnick Co., 38 Newbury St., Boston, $109,053. Former contract rescinded. **P.W.A.** Bids Apr. 20, awarded Aug. 24. Noted July 12, under "Contracts Awarded."

Mass., Norfolk—Commonwealth of Massachusetts, Dpt. Correction, office of Superintendents State Prison Colony, Industrial Buildings "A" and "D", 2 story, basement, 133x220 ft., 45x131 ft. and 72x132 ft. brick, steel, stone, concrete, at State Prison Colony, to M. Spinelli & Sons, 38 Chaucy St., Boston, $388,000. **P.W.A.** Bids Aug. 29, awarded Sept. 20.

†**Mich., Menominee**—U. S. Lighthouse Dpt., Milwaukee, Wis., constructing Peshtigo Reef Light House and erecting steel tower, to Love Constr. & Eng. Co., Muskegon, Mich., $31,800. Owner furnishes materials. Total est. $75,000.

Mont., Miles City—School Bd. Custer Co., School Dist 1, c/o H. E. Herrick, clk., plumbing and heating for school, to J. F. Regan, Miles City, $12,521; electrical work, to Miles City Electric Co., Miles City, $2,107. **P.W.A.** McIver & Cohagen, Hedden Bldg., Billings, archt. Noted Sept. 13, under "Contracts Awarded."

Mont., Shelby—Toole Co., c/o G. M. Cox, clk., heating and plumbing for court house, to E. Johnson, Glasgow, $10,516. **P.W.A.** Bids for electrical work rejected. Noted Sept. 13, under "Contracts Awarded."

N. H., Concord—State Purchasing Agent, State House, furnishing, installing boilers and equipment in State Hospital, to Combustion Eng. Co., 200 Madison Ave., New York, $23,159•••furnishing, installing stokers and equipment, to Westinghouse Electric Mfg. Co., 30 Rockefeller Plaza, New York, $17,643. Awarded about Sept. 14.

N. Y., Kings Park—Dpt. Mental Hygiene, State Office Bldg., Albany, refrigeration for bakery and storage, to Arctic Eng. Co., 123 White St., New York, $64,588.

†**N. Y., New York**—Marc Eidlitz, general contractor, 100 East 42nd St., structural steel for bank and office addition, to Ingalls Iron Wks., Verona, Pa., for Federal Reserve Bank of New York, Liberty St. Noted Aug. 30, under "Contracts Awarded."

†*Federal Government.*

N. Y., New York—Dpt. P. Markets, Municipal Bldg., general contract 48 merchant stores, Bronx Market, to Turner Constr. Co., 420 Lexington Ave., $570,000•••plumbing, to T. Egan Co., Inc., 3013 Grand Concourse, $54,910••• electrical work, to Rialto Electric Constr. Co., 250 East 43rd St., $59,500•••refrigeration, to Power Piping Co., 136 Liberty St., $86,650. Grand total $771,060. Heating and ventilating not awarded. Bids Sept. 7. Noted Aug. 30.

†**O., Franklin** — Treas. Dpt. at office Sup. Archt., Wash., D. C., general contract U. S. Post Office, to W. H. Norton, 858 South Ohio St., Columbus, $33,750. Bids Aug. 30. Noted Aug. 9.

O., Norwalk—City, W. C. Salidin, dir. P. Serv., equipment for light plant, fan, to Clarage Fan Co., 1783 East 11th St., Cleveland, $4,289••• boiler settings, to W. Kennedy & Co., 1290 Bunts Rd., Cleveland, $8,398•••ash hopper, to Allen-Sherman-Hoff Co., 2013 Prospect St., Cleveland, $2,555. Grand total $15,242. **P.W.A.** Noted July 19.

Pa., Bradford—Bd. Educ., J. B. Butterworth, supt., general contract new Junior High School, to E. J. Van Sickle, Bradford, $241,577•••heating and ventilating, to E. J. Leary, 45 Stanley St., Buffalo, N. Y., $53,279•••plumbing, to Wm. M. Clark & Co., New Castle, $13,460•••electrical work, to F. H. Nourse, Smethport, $21,438. Grand total $329,754. **P.W.A.**

S. C., Irmo—School Dist. 45, Lexington Co., constructing high school, to W. A. Crary & Son, 1226 Sumter St., Columbia, $92,900; plumbing and heating, to J. L. Powers, Bennettsville, $15,930. **P.W.A.** Bids Sept. 12. Noted Sept. 6.

†**Va., Quantico**—Yards & Docks, Navy Dpt., Wash., D. C., relocating Storehouse 7, at Marine Barracks, Spec. 7765, to Rose & Reddick, 1719 West Virginia Ave. N.E., Wash., D. C., $35,970. Bids Sept. 12. Noted Sept. 6.

†**Wisconsin**—U. S. Forest Div., constructing barracks at Camp Alvin, Alvin, and at Camp Phelps, Phelps, to Knuth Bros., Land O' Lakes, $43,222•••at Camp Globe in Clarke Co., to F. M. Reed Lumber Co., Necedah, $20,940••• at Camp Trump Lake, Soperton, to W. C. Smith, Duluth, Minn., $21,997•••at Camp Drummond, Drummond and Camp Boot Lake, Oconto Co., to Anderson & Hossum Bros., Frederic, $20,997 and $21,500 respectively•••at Camp Sawyer, Lorretta, to Couse & Saunders, Detroit, Mich., $21,956•••at Camp New Wood, Merrill, to F. Krause, Wausau, $20,880•••and at Camp Finley, Finley, to B. A. Morgan, Ironwood, Mich., $21,500. Grand total $192,992.

†**Puerto Rico**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing 2 Junior Medical Officers Quarters for Quarantine Station, San Juan, to R. P. Prann, P. O. Box 144, San Juan, $22,800. Noted July 19.

Ont., Brockville—C. S. Walters, deputy minister Dpt. P. Wks., Toronto, constructing boiler house, supplying, installing boilers, stokers, etc., to Doran Constr. Co., 78 Bank St., Ottawa. Est. $90,000. Bids Aug. 31, awarded Sept. 12.

Ont., Fort William—Secretary Dpt. P. Wks., Ottawa, plumbing for post office building, South Syndicate Ave., to A. Johnston, 620 Catherine St.; piling, to K. Shaw, 382 Archibald St. Noted Aug. 16, under "Contracts Awarded."

Ont., Fort William—Fort William Sanitarium Assn., rein.-con. sanitarium for consumptives, incl. main building, nurses residence, power plant, laundry, etc., to J. Tocheri, 1010 Donald St. Est. $200,000. Noted Apr. 5.

Ont., Toronto—Ontario Hydro-Electric Power Comn., University Ave., revised contract for construction of administration building extension reduced in size from original proposal by New Ontario Govt. has been awarded to Anglin-Norcross Ontario Ltd., 57 Bloor St., original contractors. Est. $800,000. Noted May 3, under "Contracts Awarded."

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Atascadero—Atascadero Inn plans rebuilding hotel, recently destroyed by fire, near San Luis Obispo. To exceed $100,000. Fire loss about $275,000. **Maturity indefinite.** Architect not appointed.

Calif., Sacramento—Montgomery-Ward & Co., Chicago, Ill., plans 2 story mezzanine, basement, 80x160 ft., steel, rein.-con. department store, mail order house, 9th and K Sts. $150,000 or more. Plans probably by Owner's Engineering Dpt.

Conn., Gaylordsville—H. Seiffert, 2019 East 14th St., Brooklyn, N. Y., plans group of dwellings and tract development, Sherman-Gaylordsville Rd. To exceed $100,000.

Ill., Waukegan—Alexian Brothers Hospital, c/o Brother Gerard, provincial superior, 1200 Bladen Ave., Chicago, bids in spring, 3 and 4 story, brick, concrete novitiate building, power house and generating plant, $600,000. Maher & McGrew, 1564 Sherman Ave., Evanston, archts. Noted Aug. 2.

Me., Lewiston—St. Joseph's Church, J. Milligan, pastor, Bates St., plans by E. T. P. Graham, Inc., 171 Newbury St., Boston, 3 story, basement, brick, steel, timber parochial school, concrete found., Bates St. Est. about $150,000.

Mass., Southbridge—Notre Dame Parish, 5 Salem Sq., plans convent. O. E. Nault, 48 Hamilton St., Worcester, archt. To exceed $105,000. **Maturity 1935.**

Mo., Jennings Heights—St. Louise de Marilla Roman Catholic Parish, c/o M. J. Clarke, pastor, plans church, school, parish house and home for nuns on 3 acre site, on Gares'he and LaEste Aves.

Mo., St. Louis—A. F. and A. Stauder, archts., soon let contract 6032 South Kingshighway, 1 story (ultimately 2 story), basement, 50x109 ft., brick, steel, rein.-con. church and parochial school, Tamm and Murdock Sts., for St. Gabriel the Archangel Roman Catholic Parish, c/o F. H. Skaer, pastor, 5605 Lisette Ave. Noted July 26.

N. H., Keene—Elisha F. Lane Estate, c/o E. N. Pike, engr., 38 Chauncy St., Boston, Mass., and Box 127, Keene, making plans rebuilding 2 and 3 story, basement, 40x170 ft., brick, concrete store, warehouse and apartment, Main St., recently destroyed by fire. To exceed $40,000.

N. Y., Brooklyn—Caton Towers, Inc., 191 Joralemon St., plans by W. T. McCarthy, 147 Pierrepont St., 6 story apartment, Caton and Flatbush Aves. $125,000.

N. Y., Brooklyn—A. Goldberg, 66 Court St., plans by Kavy & Kavovitt, 16 Court St., plans 6 story apartment, Ocean Ave. and Avenue K. $175,000.

N. Y., Brooklyn—South Brooklyn Savings Bank, Atlantic Ave. and Court St., plans by C. A. Holmes, 153 East 38th St., 6 story apartment, Ridge Blvd. and 76th St. $200,000.

N. Y., Merrick—Merrick Homes, Sunrise Hy., plans group dwellings, Henry St. $100,000 or more.

N. Y., New York—Abraham Beckman Cox, Cherry Valley, Otsego Co., plans by R. F. Snyder and A. L. Beincix, 207 East 43rd St., incinerator, new chimney, boiler room, etc., for stores, storage, and apartment, 201 East 63rd St. $30,000 or more.

N. Y., New York—Fifteen East 69th Street Corp., M. J. Kramer, pres., 580 5th Ave., plans by H. J. Krapp, 234 West 44th St., altering plumbing and heating for hotel, 22 East 70th St. $35,000.

N. Y., New York—T. H. Klinker Estate, O. Wagner, trustee, 253 Bway., plans altering heating, plumbing in apartment, 993 2nd Ave. To exceed $50,000.

N. Y., New York—Sylvern Corp., P. Krumholtz, pres., 384 East 149th St., plans by I. L. Cransman, 384 East 149th St., altering heating and plumbing in 6 story apartment, 210 West 107th St. $100,000.

N. Y., Springfield Gardens—Affiliated Homes, Inc., 172nd St. and 104th Ave., plans group dwellings with garages. To exceed $150,000.

N. Y., Syracuse—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, bids probably late in fall 6 story, basement, brick, steel railroad station, Burnett Ave. $500,000-$750,000. J. Gallagher, c/o owner, archt. Noted Aug. 30.

O., Shaker Heights (P. O. Cleveland)—Shaker Properties Co., 12419 Cedar Rd., Cleveland, plans by H. P. Whitworth, 1925 East 87th St., Cleveland, 25 brick veneer houses, $10,000 each.

R. I., Newport — Newport Hospital Corp., Friendship St., plans nurses home addition, Bway. Architect not appointed. To exceed $150,000.

Tenn., Cleveland—Church of God, A. J. Tomlinson, overseer, A. D. Evans, bus. mgr., plans modern auditorium, at least 5,000 seating capacity. Architect not appointed.

Que., Montreal—Governors McGill University, Sherbrooke St. W., calling for competitive plans for gymnasium. $1,000,000.

Que., Montreal—Hebrew Consumptive Aid Assn., Inc., purchased site on Sherbrooke St. for hospital for tuberculosis patients. $200,000.

BIDS ASKED

Calif., San Francisco—W. P. Day, archt., Financial Center Bldg., taking bids part 1 and 2 story, rein.-con. publishing plant, Publishing Co., 460 4th St. $150,000. Noted Aug. 23.

Mo., St. Louis—Oct. 4, by South Side Branch Y.M.C.A., 1528 Locust St., general contract 2 story, basement, 115x167 ft., rein.-con., brick, stone Y.M.C.A. building, 2232 South Grand Blvd. $225,000. Klipstein & Rathmann, 316 North 8th St., archts. Noted Dec. 12, 1929.

N. Y., New York—See "Contracts Awarded."

N. Y., New York—Schwartz & Gross, archts., 347 5th Ave., taking bids general contract 3 story, basement, brick, steel, bank, 102 Orchard St., for Public National Bank, 76 William St. $200,000. Noted Sept. 13.

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Commercial Buildings (Continued)

CONTRACTS AWARDED

Conn., Bridgeport—H. C. Elton, archt., 1188 Main St., plumbing and heating for 1 story, 100x200 ft., granite, brick store, Fairfield Ave., to W. H. Clark, 160 Elm St.***structural steel, to Bethlehem Fabricators, Bethlehem, Pa.***granite, to American Black Granite Co., Ashland, Wis.***electrical work, to W. T. Rock, 1115 Main St.***arch. tile, to Frank P. Goodwin Co., 185 Church St., New Haven***elevators, to Otis Elevator Co., 124 Meadow St., New Haven. Noted Aug. 30, under "Contracts Awarded."

Conn., Hartford—L. B. Scheide, Inc., archt., 36 Pearl St., 2 story office building, 102 Pearl St., and alterations and new heating plant at 140-150 Trumbull St. and basement of 93 Asylum St., for J. J. Corning Estate, c/o Hartford Conn. Trust Co., 750 Main St., to Allyn Wadhams Co., 15 Lewis St., $81,800 and $45,789 respectively. Awarded Sept. 14. Noted Aug. 23.

N. J., Orange—Womens Club of Orange, 556 William St., East Orange, constructing clubhouse, to Carlson Co., 89 Walnut St., Montclair. To exceed $100,000. D. E. Ward, 1 Madison Ave., New York, archt. Noted June 28.

N. Y., New York—Chutick & Minkin, 16 Court St., Brooklyn, 6 story, 90x192 ft. apartment, Avenue A and 4th to 5th Sts., separate contracts, $300,000 or more. Kavy & Kavovitt, 16 Court St., archts.

N. Y., New York—Estate of J. J. McGrath, 45 Wall St., heating and plumbing alterations in 6 story apartment, 139 West 128th St., to B. S. Goodman, 1440 Bway., New York. Est. $28,000 or more. Noted Aug. 30.

N. Y., New York—One Hundred Twenty East 89th Street, Inc., J. Silberman, pres., c/o I. Margon, archt., 220 East 42nd St., 6 story, store and apartment, 1328 Lexington Ave., day labor and separate contracts, $250,000. Noted Sept. 13.

N. Y., New York—Society of New York Hospital, 71 Bway., 82x200 ft. apartments, 5-23 West 15th St., separate contracts, $125,000. Bids about Oct. 15. G. Miller & J. Martin, 10 West 47th St., archts.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Arizona—MINING PROJECT—Mellgren Mines Corp., Tombstone, plans developing precious metal mining properties, incl. mill, equipment, etc. Project financed by $420,000 stock issue.

Calif., Oakland—BREWERY—Wunder Brewing Co., 2119 Linen St., abandoned plans for brewery reconstruction, Adeline and 25th Sts., $150,000. A. R. McLaren, 611 Howard St., San Francisco, engr. Noted Nov. 30.

Calif., San Jose—WAREHOUSE, etc.—Muirson Label Co., 435 Stockton Ave., plans being completed by C. McKenzie, Twohy Bldg., 1 story, 126x165 ft., rein.-con. warehouse and cutting room, Stockton Ave. $40,000.

Ill., Chicago—SOY BEAN MILL—Glidden Co., 21-11 44th Ave., Long Island City, N. Y., plans soy bean mill, Moffat St. and North Loraine Ave. To exceed $40,000.

Ill., Peoria — EVAPORATOR BUILDING — Hiram Walker & Sons, plans 3 story, basement, 62x70 ft., brick, steel, rein.-con. evaporator building, plain found., in connection with distillery plant. $50,000. Smith, Hinchman & Grylls, Marquette Bldg., Detroit, Mich., engrs. and archts.

Md., Baltimore—PLANT—Albert Kahn, Inc., archts., New Center Bldg., Detroit, Mich., soon let contract 600x980 ft. assembling building, 50 x240 ft. office buildings, 52x96 ft. boiler house, 85x245 ft. service building, 50x315 ft. loading dock, Broening Hy., for Chevrolet Motor Co., 3044 West Grand Blvd., Detroit, Mich. Noted Aug. 16.

Mass., New Bedford—BAKERY—Guisti Baking Co., 1395 Purchase St., plans by N. C. Smith, 222 Union St., 1 story, basement irregular sized, brick, steel, concrete addition. To exceed $28,500.

Mass., New Bedford—COPPER and BRASS PLATE MILL—Revere Copper & Brass Co., W. H. Chase, mgr., 24 North Front St., plans brick, concrete, structural steel, North Front St. Private plans. To exceed $40,000.

Mass., South Boston—MARKET—Superior Realty Co., 530 Gallivan Blvd., Dorchester, plans by W. M. Bacon, 530 Gallivan Blvd., Dorchester, 1 story, basement, irregular sized, brick, steel, concrete market, Bway. $125,000.

Mich., Mt. Clemens—PLANT—J. C. Fleming Co. plans ice cream plant. To exceed $40,000. Architect not appointed.

Mich., Port Huron—BREWERY—Basshead Ale & Brewing Co. plans reconditioning plant for A. B. Parfet plant into brewery. $50,000.

Mich., Wheeler—OIL REFINERY—McClanahan Refining Co., Mt. Pleasant, preparing plans oil refining plant, steel, concrete. Private plans.

Minn., St. Paul — MALTING PLANT — T. Hamm Brewing Co., 681 East Minnehaha St., plans by C. H. Johnston, 360 Robert St., foundation for 3 or more story, 100x125 ft., rein.-con., brick, steel, 681 East Minnehaha St. $100,000. O. W. Luebkert, Los Angeles, Calif., archt. for superstructure.

Minn., St. Paul—PLANT—Seeger Refrigeration Co., 850 Arcade St., plans by C. H. Johnston, 360 Robert St., plant addition. $60,000.

Mont., Rimini—FLOTATION MILL—Montana Load. Inc., Power Bldg., Helena, plans ore flotation mill. $45,000.

Mo., St. Louis—FACTORY—Carter Carburetor Co., 2838 North Spring Ave., plans 4 story, rein.-con., brick addition. Est. $100,000. **Maturity in 1935.**

Nevada—GOLD MINING—Great Dike Gold Mines, Inc., c/o Rose Associates, 49 Wall St., New York, plans gold mining development. To exceed $50,000.

N. J., Belmar—PLANT—Sterner Coal-Lumber Co., plans repairing fire damage to plant. $150,000 loss. Architect not appointed.

N. Y., Brooklyn—SERVICE GARAGE—Dondero & Schiffino, 426 9th St., rejected bids service garage, 18th Ave. and Rutherford Pl. $30,000 or more. Project abandoned. C. W. Van Keuren, 335 East 19th St., archt. Noted Mar. 8.

N. Y., Brooklyn — REPAIR, SERVICE and GARAGE—White House M & C Co., Snediker and Liberty Aves., plans by Kavy & Kavovitt, 16 Court St., 1 story, brick, 55x200 ft., brick, Snediker and Liberty Aves. $32,000 or more.

N. Y., Brooklyn—SERVICE GARAGE—Varick Garage Corp., 410 Bway., plans by M. J. Caffero, 391 Fulton St., 1 story, 115x203 ft. service garage, Bridgewater and Vandam Sts. To exceed $30,000.

N. Y., Long Island City—STORAGE WAREHOUSE—National Sugar Refining Co., 129 Front St., New York, plans by N. R. Andrews, Yonkers, or c/o owners, 1 story, 101x120 ft., storage warehouse, 56th Ave. and 1st St. $42,000.

N. Y., New York — SERVICE GARAGE — J. McCluskey, 2536 Bathgate Ave., bids in December or later, 2 story, 83x100 ft., service garage, Fordham Rd. and Bathgate Ave. $50,000. W. H. Wright, 347 Madison Ave., archt. Noted Aug. 30.

N. Y., New York—SERVICE GARAGE, etc.—Brookman Realty Co., D. G. Walker, pres., 165 Bway., plans by R. R. Ralman, 20 Wood Ave., Amityville, 50x200 ft., service garage and repair shop, 613 East 18th St. Est. $35,000.

O., Chillicothe—LABORATORY—Mead Paper Corp. plans laboratory. $60,000 or more. Architect not appointed.

O., Mansfield—PLANT—Westinghouse Electric & Mfg. Co., plans additions and equipment for refrigerator division. $150,000.

O., Youngstown — DAIRY PLANT — Isaly Dairy Co., Mahoning Ave., plans 3 story, basement, 40x100 ft., brick, steel, concrete addition, $100,000. **Maturity Oct. 1.** Private plans.

Pa., Eaglerock — POWER PLANT — Henry's Bend Community Assn., Henry's Bend (Eaglerock P.O.), P. C. Stubler, pres., 23 Elm St., Oil City, plans electric light and power plant, also installing 2 mi. electric transmission lines to serve summer cottages, $28,500 or more.

Pa., Latrobe—PLANT—American Cyanamid & Chemical Co., Latrobe, Pa., and 30 Rockefeller Plaza, N. Y., plans repairing fire damaged plant. Est. about $50,000. Private plans. Owners will proceed at once with project.

Pa., Neville Island (Pittsburgh)—DRY ICE PLANT—Frozen Carbonic Corp., Neville Island, plans by Hannah & Sterling, Grant Bldg., Pittsburgh, 50x83 ft., brick, concrete, steel dry ice plant, also plans gas retorts and lime kilns.

R. I., Hillsgrove — MANUFACTURING — Hingeco Mfg. Co. plans by Dimitri & Dimitri, 509 Westminster St., Providence, 2 story, basement, brick manufacturing plant. $30,000 or more. **Maturity very indefinite.** Project in abeyance at present.

Tex., Longview—BOTTLING PLANT—B. F. Martin, c/o J. Sanger, Longview, soon takes bids 2 story, 50x100 ft., brick, rein.-con. cola bottling plant. $35,000. P. E. Zimmerman, 1st Natl. Bank Bldg., archt. Noted Sept. 6.

Wyo., Gillette—GAS PLANT—See "Unclassified."

N. S., Antigonish—PLANT—J. D. McLellan plans woodworking plant. $35,000.

Que., Drummondsville—PLANT—Eagle Pencil Co. Ltd. making plans addition to plant. $35,000.

Que., Montreal — PLANT — Altimas Lumber Co. Ltd., plans Forest Products Manufacturing plant. $37,000.

Que., Montreal—PLANT—General Motors of Canada, Ltd., 1253 McGill College St., making plans and takes bids this fall 3 story, basement, 150x150 ft., stone, steel, concrete plant, Atwater Park.

Que., Montreal—HYDRO ELECTRIC DEVELOPMENT—Power Corp. of Canada Ltd., 355 St. James St. W., plans extending hydro development of St. Croix River.

Que., St. Agathe de Monts—PLANT—Laurentian Wood Products Ltd. plans plant. $45,000.

Que., Three Rivers—PLANT—Lebori Process Lumber Industries Ltd., plans plant. $350,000.

BIDS ASKED

Minn., Minneapolis—GARAGE and WAREHOUSE, etc.—See "Contracts Awarded."

N. Y., Jamaica — GARAGE and REPAIR SHOP—See "Contracts Awarded."

N. Y., New York—WAREHOUSE—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Richmond—DISTRIBUTION PLANT—Mohawk Oil Co., 405 Montgomery St., San Francisco, oil distributing plant, steel storage tanks, corrugated iron garage and warehouse, Outer Harbor Dist., to E. J. Freethy, 1301 Roosevelt Ave. $40,000. Awarded Sept. 13.

Conn., Greenwich—WAREHOUSE—Electrolux, Inc., 500 5th Ave., 2 story, 85x135x155 ft., brick, steel, to John L. Duzo & Sons, 148 Railroad Ave. Est. exceeds $28,500. Bids Sept. 4, awarded Sept. 18. Noted Sept. 13.

Conn., Hartford—SERVICE STATION—Firestone Realty Co., H. J. Aitken, 575 Connecticut Blvd., East Hartford, furnishing, installing automatic electric elevator, 3,000 lbs. capacity, in new service building, Main St., to General Elevator Service Co., 1029 Main St. Noted May 10, under "Contract Awarded."

Conn., Hartford—FACTORY—Hartford Empire Co., 347 Homestead Ave., heating for 1 story, 100x155 ft., brick, steel top story factory addition, to W. B. Carson, Inc., 220 Sargeant St.***plumbing, to J. Lyon & Sons, 20 Central Row***electrical work, to Bauer & Co., 440 Asylum St.***sprinklers, to Hartford Sprinkler Co., Hartford***steel, to Standard Structural Steel Co., 1014 Wethersfield Ave.***brick, to Michael Kane Brick Co., 245 New Park Ave.***cast stone, to Hercules Cast Stone Co., 25 Sterling St.***lumber, to Edwin Taylor Lumber Co., 108 Charter Oak Ave.***millwork, to Hartford Builder's Finish Co., 34 Potter St. Noted Aug. 30, under "Contracts Awarded."

Ind., Austin—POWER SUBSTATION—Pub. Serv. Co., Traction Bldg., Indianapolis, steel for steel power substation and transmission and distributing lines, to Central States Bridge Co., 601 Beecher St., Indianapolis. Total est. $60,000. Private plans.

Ind., Evansville—FACTORY—Servel Corp., steel for brick, steel factory addition, to International Iron & Steel Co., Evansville. Total est. $60,000. Private plans.

Minn., Minneapolis—GARAGE and WAREHOUSE, etc.—Tankar Gas, Inc., 2504 Foshay Tower, K. T. Wiedemann, pres., general contract 40x135 ft., brick, concrete garage, warehouse, office, filling station and gas bulk plant, incl. 8 tanks, total capacity 578,000 gal. 3631 West Lake St., day labor. $40,000. Excavation for tanks under way.

Minn., St. Paul — GRAIN ELEVATOR — T. Ham Brewing Co., 681 East Minnehaha St., general contract 500,000 bu. grain elevator, rein.-con., at 681 East Minnehaha St., to Barnett & Record, 700 Flour Exch. Bldg., Minneapolis. $100,000 with equipment. Excavation begun.

N. J., Graselli—WAREHOUSE and LABORATORY—General Aniline Wks., Inc., general contract warehouse and laboratory, to White Constr. Co., 95 Madison Ave., New York; steel, to Lafayette Iron Wks., Inc., 649 Grand St., Jersey City. Est. $150,000.

N. Y., Jamaica—GARAGE and REPAIR SHOP—Christopher Ripp, Meadowmere Park, Lawrence, 2 story, 40x135 ft., garage and repair shop, Hillside Ave. and Parsons Blvd., by separate contracts. $45,000. A. Faber, c/o owner, archt. Noted Sept. 6.

N. Y., Long Island City—FACTORY—Morganite Brush Co., 33-02 48th Ave., altering 1 story factory, 48th Ave. and 34th St., to Queens Petro Co., 165-19 Hillside Ave. Noted Sept. 6.

N. Y., New York—STORAGE, etc.—Daniel Reeves, Inc., 44 West 143rd St., 3 story, basement, 32x199 ft., storage and distribution. 43 West 142nd St., to Chain Building Corp., 391 East 149th St. Est. $50,000. Noted Sept. 13.

Tex., Longview—BOTTLING PLANT—Coca Cola Bottling Co., c/o B. F. Martin & J. Sanger, 2 story, 50x100 ft., brick, rein.-con. bottling unit, to C. S. Lambie Constr. Co., Longview. Est. $35,000 Noted Sept. 13.

Ont., Port Stanley—PUMP HOUSE, etc.—Thayer's Ltd., 424 Wellington St., London, pump house and two 1 m.g. (Imperial) steel storage tanks, also pipe line, to Horton Steel Storage Tanks, Fort Erie, $50,000.

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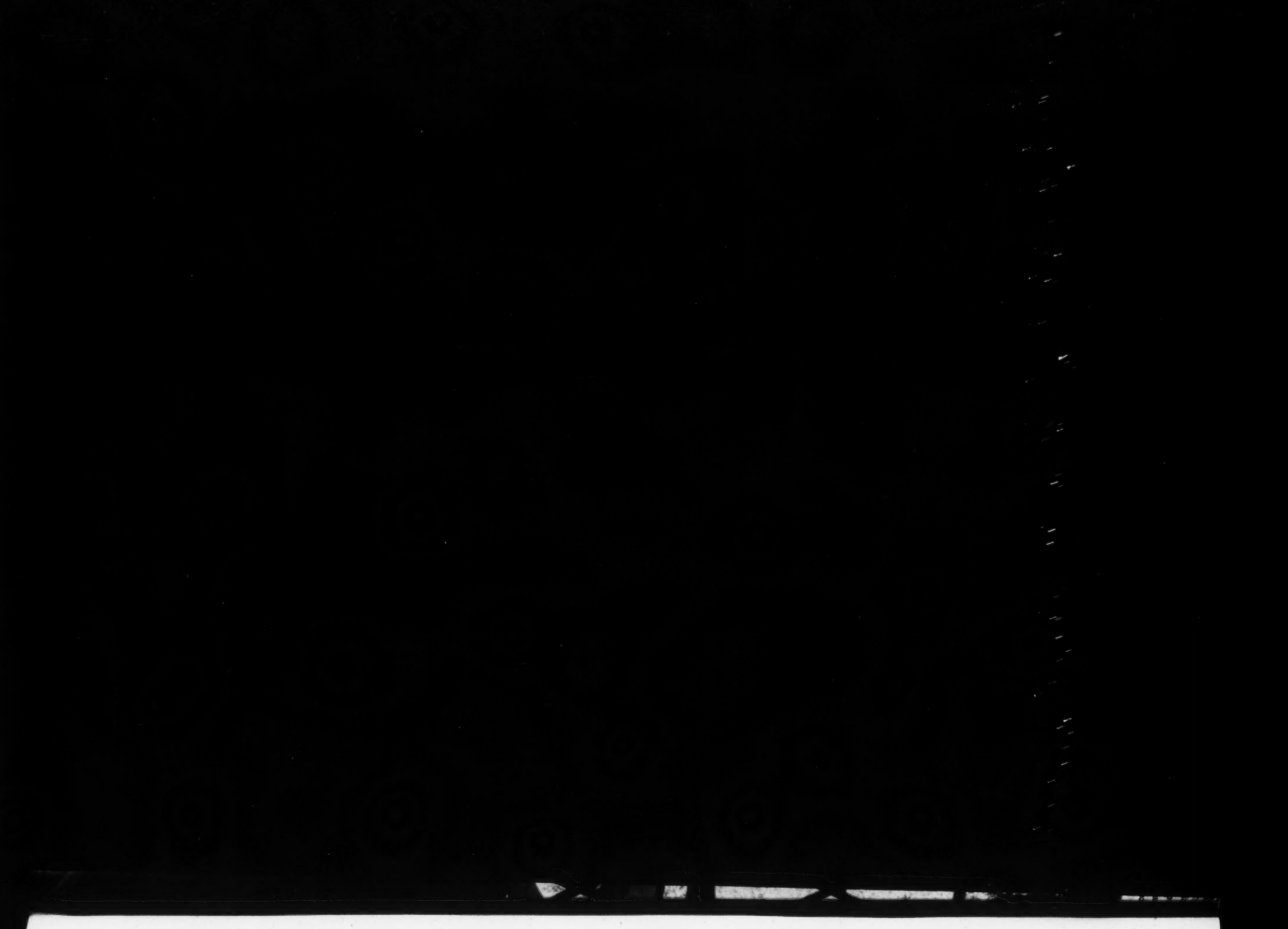
For official proposal advertising see Searchlight Section

†Federal Government